RESULTS OF THE KYOTO UNIVERSITY
SCIENTIFIC EXPEDITION
TO THE KARAKORAM AND HINDUKUSH, 1955, Vol. VIII

ADDITIONAL REPORTS

Edited by
SIRO KITAMURA AND RIOZO YOSII

THE COMMITTEE OF THE KYOTO UNIVERSITY SCIENTIFIC
EXPEDITION TO THE KARAKORAM AND HINDUKUSH

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EDITORIAL NOTE

The series of the Results of the Kyoto University Scientific Expedition to the Karakoram and Hindukush, 1955, has been completed with the present volume. It consists of eight volumes:

- Vol. I. Cultivated Plants and their Relatives, edited by K. YAMASHITA, 1965
- Vol. II. Flora of Afghanistan, edited by S. KITAMURA, 1960
- Vol. III. Plants of West Pakistan and Afghanistan, edited by S. KITAMURA, 1963
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- Vol. V. Personality and Health in Hunza Valley, edited by K. IMANISHI, 1963
- Vol. VI. Zirni Manuscript, edited by S. IWAMURA, 1961
- Vol. VII. Geology of the Karakoram and Hindukush, edited by S. MATSUSHITA and K. HUZITA, 1965
- Vol. VIII. Additional Report, edited by S. KITAMURA and R. YOSII, 1966

The present volume contains reports of the research results on materials brought by the major Expedition and those brought from related areas by the five expeditions as follows:

- Panjab University - Kyoto University Joint Expedition to Panjab Himalaya, 1956, headed by Professor A. H. BEG and Professor K. HUZITA
- Panjab University - Kyoto University Joint Expedition to Swat, 1957, headed by Professor S. MATSUSHITA
- Chogolissa Expedition of the Academic Alpine Club Kyoto, 1958, headed by Professor T. KUWABARA
- Kyoto University Pamir Hindukush Expedition, 1960, headed by Professor Y. SAKATO
- Pakistan - Japanese Saltoro Expedition, 1962, headed by Professor A. H. BEG and Professor T. SHIDEI.

The Editorial Board is indebted to the Fauna and Flora Research Society which, through the financial aid from the Asahi Press, has assisted in preparing the manuscripts for the publication.

Kyoto
March 1, 1966

A. O.

CONTENTS

Additional Reports

Geology

1. MATSUSHITA, Susumu and HUZITA, Kazuo: Geological Research in the Western Karakoram 1

Botany

1. HIRANO, Minoru: Freshwater Algae from northeastern part of Afghanistan 15
2. HIRANO, Minoru: Freshwater Algae of Karakoram and Swat-Himalaya 55
3. KITAMURA, Siro: Additions and Corrections to Flora of Afghanistan 67

Zoology

1. ASAHINA, Syoziro: The Blattaria from Iran and Afghanistan... 155
2. ASAHINA, Syoziro: The Afghan Odonata taken by Dr. Yosii in 1960 159
3. FUKUI, Tamao: On a Cestode collected from a Goat of Afghanistan 165
4. GOSE, Kyuemon: An Elmidae Larva from Afghanistan, Pamir (Insecta-Coleoptera) 169
5. HASEGAWA, Yoshikazu: A whistle-like bone from Kunduz Castle, Northern Afghanistan 171
6. ICHIKAWA, Atsuhiko and KAWAKATSU, Masaharu: Report on Freshwater Planaria from Afghanistan 175
7. IMAMURA, Taiji: Some water-mites (Hydrachnellae) from Afghanistan 189
8. KAMIYA, Hiroyuki: Coccinellidae of Afghanistan (Insecta-Coleoptera) 201
9. KAWAI, Teizi: Plecoptera from the Hindukush................. 203
10. KIMOTO, Shinsaku: A list of the Chrysomelidae collected by the Scientific Expedition of Kyoto University to Afghanistan in 1960 (Coleoptera) 217
11. KUWAYAMA, Satoru; Neuroptera of Iran and Afghanistan... 221

12. MIYAMOTO, Syôiti: Some aquatic and semiaquatic bugs from Afghanistan 225
13. MORIMOTO, Katsura: Curculionidae of Afghanistan 227
14. MORIUTI, Sigeru: Records of Yponomeutid-moths from Afghanistan collected by Prof. R. Yosii in 1960 229
15. NAKANE, Takehiko: Coleoptera of Afghanistan 231
16. SAKAGUCHI, Kôhei: Fleas (Siphonaptera) of Afghanistan ... 249
17. SATO, Masataka: Some species of the aquatic Coleoptera from Afghanistan and Pakistan 255
18. SAWADA, Kohei: Coleoptera Staphylinidae of Afghanistan... 257
19. TAKAHASHI, Ryoichi: Some Aphididae from Afghanistan and W. Pakistan 263
20. TOKUDA, Mitosi: On a Vole and a Mouse collected from Mt. Noshaq by Prof. R. Yosii 271
21. TOKUNAGA, Masaaki: Some Nematocerous Diptera of the North-east of Afghanistan 273
22. UÉNO, Masuzo: Mayflies (Ephemeroptera) collected by the Kyoto University Pamir-Hindukush Expedition 1960...... 287
23. UÉNO, Masuzo: Crustacea (Cladocera, Copepoda and Amphipoda) collected by the Kyoto University Pamir-Hindukush Expedition 1960........ 299
24. UÉNO, Shun-Ichi and NAKAMURA, Kenji: The Anurans collected by the Kyoto University Pamir-Hindukush Expedition 1960 327
25. WIGGINS, Glenn B.: Trichoptera of Afghanistan 329
26. YANO, Kôji: Pterophoridae and Aegeriidae (Lepidoptera) from Afghanistan 331
27. YOSII, Riozo: On some Collembola of Afghanistan, India and Ceylon, collected by the KUPHE-Expedition, 1960... 333
28. YOSII, Riozo: Snow Collembola of the Siachen Glacier in Karakoram 407
Index 411

Geology

Geological Research in the Western Karakoram

By

S. MATSUSHITA and K. HUZITA

As mentioned in the preface of Volume VII of this series, we carried out a geological reconnaissance survey of the Western Karakoram in 1955, as the members of the Karakoram team of the Kyoto University Scientific Expedition to the Karakoram and Hindu Kush, 1955. The route of our journey was as follows: Gilgit–Indus river–Istak(Stak)–Istak La–Tormik river–Ganga La–Basha river–Braldu river–Askole–Baltoro glacier–Askole–Biafo glacier–Hispar pass–Hispar glacier–Nagar–Hunza–Hunza river–Gilgit. We started from Gilgit on the 4 th June and returned there on the 21st August.

The route mentioned above was covered by us on foot with two exceptions,

Table 1. Stratigraphical Sequence in the Western Karakoram

Cainozoic	Quaternary	Holocene	(7a) Fluviatile deposits	
		Pleistocene	(7b) Glacial deposits, (7c) Fluvio-glacial deposits	
	Tertiary	Neogene	(6a) Granite of Baltoro, (6b) Pegmatite of the Braldu	
		Palaeogene	(6c) Granite (orthogneiss) of Haramosh	
Mesozoic		Cretaceous	(4b) Limestone-dolomite series of Ganga La (4a) Green and black phyllite ser. of Tormik and Chalt	(5) (4a-5) Gilgit gneiss (hornblende-gneiss) complex of Gilgit (4a)
		Jurassic		
		Triassic	? (3) Granite (orthogneiss) of the Braldu and Shigar	
Palaeozoic		Permian	(2) Limestone and slate series of Gasherbrum	
		Carboniferous	?	
		Devonian	(1) Mica-schist and gneiss series of the Braldu (1) Mica-schist and gneiss of the Haramosh invader	
		Silurian	?	

namely, we used jeep from Gilgit to Parri on the first day of our reconnaissance and horseback from Hunza to Gilgit in the last stage of the journey. Most part of the route was mapped on a scale of 1 : ca 14,000 or 28,000 by compass and pace method.

The metamorphic and plutonic rocks collected by us were studied by Prof.G. Kojima (1965), while the chemical compositions of some granitic rocks were investigated by Dr. Y. Ukai (1965). The age of a pegmatite collected from Dusso on the right bank of the Braldu river was determined by Dr. I. Hayase (1965). Some of the results of our reconnaissance was reported by one of us soon after our return from the Karakoram to our country (S. Matsushita, 1956). An outline of history of the geological researches in the Karakoram was given in Volume VII of this series.

Stratigraphy

The limestone and slate series constituting the Gasherbrum mountain group in the Upper Baltoro (2) is chiefly Permian and Carboniferous in age, since *Neoschwagerina* and *Schwagerina* were reported by the Italian palaeontologists from the moraine of a glacier of Gasherbrum IV in 1934-35 (Silvestri, A.) and from the right lateral moraine of the Upper Baltoro glacier in 1955 (Desio, A. é M.B. Cita). This series, therefore, may be correlated to the Permo-Carboniferous Darkot Group which was named by the Australian geologists Ivanac, Traves and King after the name of the type locality* of the Group in 1956.

According to T. E. Gattinger (1961), the limestone and slate series mentioned above is distributed not only in the Baltoro district, but also in the mountains on both sides of the Braldu and Shigar especially in their ridge parts. The age of the limestone-dolomite part of the series under consideration is assigned by Gattinger to Permo-Carboniferous and early Triassic on account of the rock appearance as well as fossil evidence.

The mica-schist and gneiss series** of the Braldu (1) corresponds to Gattinger's Central Crystallines. On the east of Shengus on the right bank of the Indus and on the south of Mt. Haramosh, a schist-gneiss series similar to the series (1) forms a remarkable anticline, of which the axis crosses the Indus in a NNE-SSW direction. This schist-gneiss mass which is to be regarded as the north-northeastern extension of the Nanga Parbat dome (See Vol. VII, p. 92, 97.) seems to invade northwards into the Gilgit gneiss complex.

Gattinger divided his Central Crystallines into the nucleus of orthogneiss and the roof of paracrystalline. According to him, the orthogneiss is distributed chiefly along the Lower Braldu and Shigar valleys, while his paracrystalline (mica-schist and amphibolite) occupies the rest of the Biaho Lungma-Braldu-

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* The Darkot Village is situated about 200 km to the northwest of Gilgit.

** Among the gneisses, the orthogneiss belongs to (3).

Shigar district, thus the orthogneiss is generally located below the paracrystalline, which is covered in turn by the above-mentioned limestone-slate series in a flat overthrust contact.

The age of the original rocks of the paracrystalline has been inferred by Dainelli (1934), Desio (1936) and Gattinger to be Middle Palaeozoic. Though we agree with them principally, we are inclined to add Carboniferous to the age in question. Discussing the close time relation between the intrusion of granitic materials and the regional matamorphism, Gattinger assigned the time of intrusion and regional metamorphism to a certain stage of the Younger Variscan orogeny (1961, p. 103).

There are numerous veins of pegmatite and aplite cutting gneiss and schist in the Braldu-Shigar district. It has been mentioned in a preceding page that the age of a pegmatite cutting a gneiss at Dusso on the right bank of the Lower Braldu was measured by Dr. I. Hayase by means of Rb-Sr as well as K-Ar methods at 28 million years (1965). It may be said, therefore, that most of the pegmatite and aplite veins were derived from the Tertiary granite magma.

There have never been found fossils proving the age in the green and black phyllites of the Tormik valley and the Chalt district (4a), nor in the limestone and dolomite of Ganga La and its vicinity (4b). As a result of our reconnaissances in the area between Gilgit and Ghizar in 1956 and 1957, however, we are convinced that the phyllite, limestone and dolomite series in question is no other than the eastern to southeastern extension of our Green series and Yasin Group which are well developed in the Gilgit-Yasin-Ghizar area (See Volume VII of this series). As mentioned in Volume VII, the Green series is assigned by us to early Cretaceous at the evidence of the occurrence of the early Cretaceous coral *Thamnastria matsushitai* Eguchi (1965) in the series in question. The Yasin group yields many molluscan, coral and other fossils proving that its age is also early Cretaceous (lower Aptian) (Ichikawa and Maeda, 1965).

It is a noticeable fact that in the neighbourhood of Chalt, we have found in a green lava, a component of the green phyllites, the pillow structure, an evidence of submarine eruption (See Vol. VII, p. 91.).

Gilgit gneiss of Gilgit (4a-5) composed of hornblende-gneiss and other gneisses is developed in the Gilgit-Nomal-Sassli district (Kojima 1965, p. 97, 99, 100). Though we have no exact petrographic evidences, we are inclined to infer from our field observations on the gneisses and the green phyllites that the Gilgit gneiss has been derived from the Lower Cretaceous green rocks and the Creto-Palaeogene granitic materials.

The granite of Baltoro (5) is a muscovite-biotite-granite distributed in the Baltoro district (See Dainelli, 1934, Desio, 1936, Dyrenfurth, 1936 and Kojima, 1965). It has hitherto been ascertained that the granite mentioned above is intruded into the limestone-slate series of Gasherbrum and also into the mica-sdhist and gneiss in the Upper Braldu and Biaho Lungma (Gattinger, 1961, pp. 102, 105). Our granite of Baltoro is called the granite of Axial Zone by Gattinger (1961), as the granite forms the Axial Zone of the Karakoram. It is known to extend toward WNW for a long distance as far as the Karambar river northeast of Ishkuman. Further westward continuous extension of the granite under consideration is not known. From the Karambar river westward, the long batholith

Table 2. Zonal Arrangement of the Rock Formations in the Western Karakoram (from the north to the south)

Name of zone	Main rock formation
(E) Tethys zone	Marine Permo-Carboniferous (plus Lower Triasic) formations
(D) Axial zone	Granite of Baltoro (Tertiary)
(C) Central schist-gneiss zone	Mica-schist and gneiss series derived from marine Middle Palaeozoic (plus Carboniferous) and Younger Variscan granite
Yasin-Chalt fault	
(B) Green phyllite-limestone zone	Crystalline limestone, dolomite ; Green and black phyllite derived from Lower Cretaceous marine sediments and volcanics
(H) Haramosh invader	Mica-schist and gneiss derived from the Palaeozoic sediments and Tertiary granite
(A) Gilgit gneiss zone	Hornblende-gneiss derived from Lower Cretaceous green rocks and Creto-Palaeogene granite

Table 3. Comparison of Zonal Arrangement of Rock Formations among Authors

H. J. Schneider (1956)	S. Matsushita and K. Huzita (1966)	T.E. Gattinger (1961)
Between Gilgit and Batura district	Western Karakoram	Between Skardu and Shaksgam
V Tethys-Karakoram	(E) Tethys zone	Tethys-zone
IV Batura-Mustagh	(D) Axial zone	Achsen-zone
III Kristallinschiefer	(C) Central schist-gneiss zone	Zentral Kristallin
II Chalt-Schieferserie		
I	(B) Green phyllite-limestone zone	Schuppen-zone Südrand Kristalline
H Hornblende-gneiss	(A) Gilgit gneiss zone	
		Intrusiv-Ligament

of granite becomes small plutons. In the area to the west of the Hunza river, the granite in question is also called the Batura-Mustagh hornblende-granite by H. J. Shneider (1956) and the Karakoram Granodiorite by Ivanac, Traves and King (1956). Gattinger considers that his Axial Zone granite is alpine synorogenetic (Gattinger, p. 7), i. e. Tertiary.

Geological Structure

The geological structure of the Western Karakoram is characterized by the zonal arrangement of rock formations shown in Table 2. The general trend of each zone is NW-SE. The orographical trend coincides with the geological one, namely the zonal trend of rock formations. For example, (D) Axial zone composed of Gattinger's alpine synorogenetic granite with the roof of Permo-Carboniferous formations in some parts of the Baltoro district makes the highest mountain range in the Karakoram with all of its 8000 m class peaks and most of its 7000 m class ones. This Axial zone may be said the zone of the greatest upheaval in the Karakoram.

The boundary between each zone is in some cases represented by a fault. Thus the boundary between (B) Green phyllite-limestone zone and (C) Central schist-gneiss zone is represented by the Yasin-Chalt fault running from Mastuj in the Chitral state, through Yasin, Chalt and the Chogolungma glacier, to the Shigar valley.

Rock formations of each zone are folded. Large plunging folds of the mica-schist and gneiss series of (C) Central schist-gneiss zone are well observed in the Lower Biafo and the Biaho Lungma district. The axes of the folds there seem to run roughly from the east to the west.

As to the fold of the phyllite-limestone formations constituting the Green phyllite-limestone zone, our observed facts are too little to mention here. The strike and dip of the limestone-dolomite formation in the vicinity of Ganga La are N 60° W and 60° NE respectively. This limestone-dolomite formation seems to constitute the Haramosh range elongated in a NW-SE direction in the area between Ganga La and Skardu. Therefore, the limestone composing the ridge part of the mountain on the right bank of the Shigar river, as mentioned by Gattinger (1961, p. 29), may be inferred to be the southeastern continuation of the limestone-dolomite formation in the vicinity of Ganga La.

As referred to in a preceding page, on the east of Shengus and on the south of Mt. Haramosh, a remarkable anticline of schist-gneiss series crosses the Indus in a NNE-SSW direction, and the schist-gneiss mass in question is to be regarded as the north-northeastern extension of the Nanga Parbat dome. G. Kojima (1965) has revealed that to the west of the anticlinal zone under consideration, there develops the Gilgit gneiss, and that to the east of the said anticline are developed gneisses showing similarity to the Gilgit gneiss. Some of his accounts follow. "The most remarkable occurrence of blastomylonites marks the boundary between the axial gneiss zone of the Alpine Himalaya and its western mantle, the Gilgit gneiss zone in the vicinity of Sassli along the Indus" (1965, p. 97). It must be noticed that the axial zone under consideration belonged originally to the Himalaya and that afterwards in the Tertiary Himalayan orogeny, it invaded into a southern part of the Karakoram, (A) Gilgit gneiss zone. The axial mass under consideration, therefore, may properly be named the Harmosh invader which, after crossing the Indus from SSW to NNE and reaching Mt. Haramosh, is inferred, in accordance with the general geological structure in this district, to turn its direction to the northwest.

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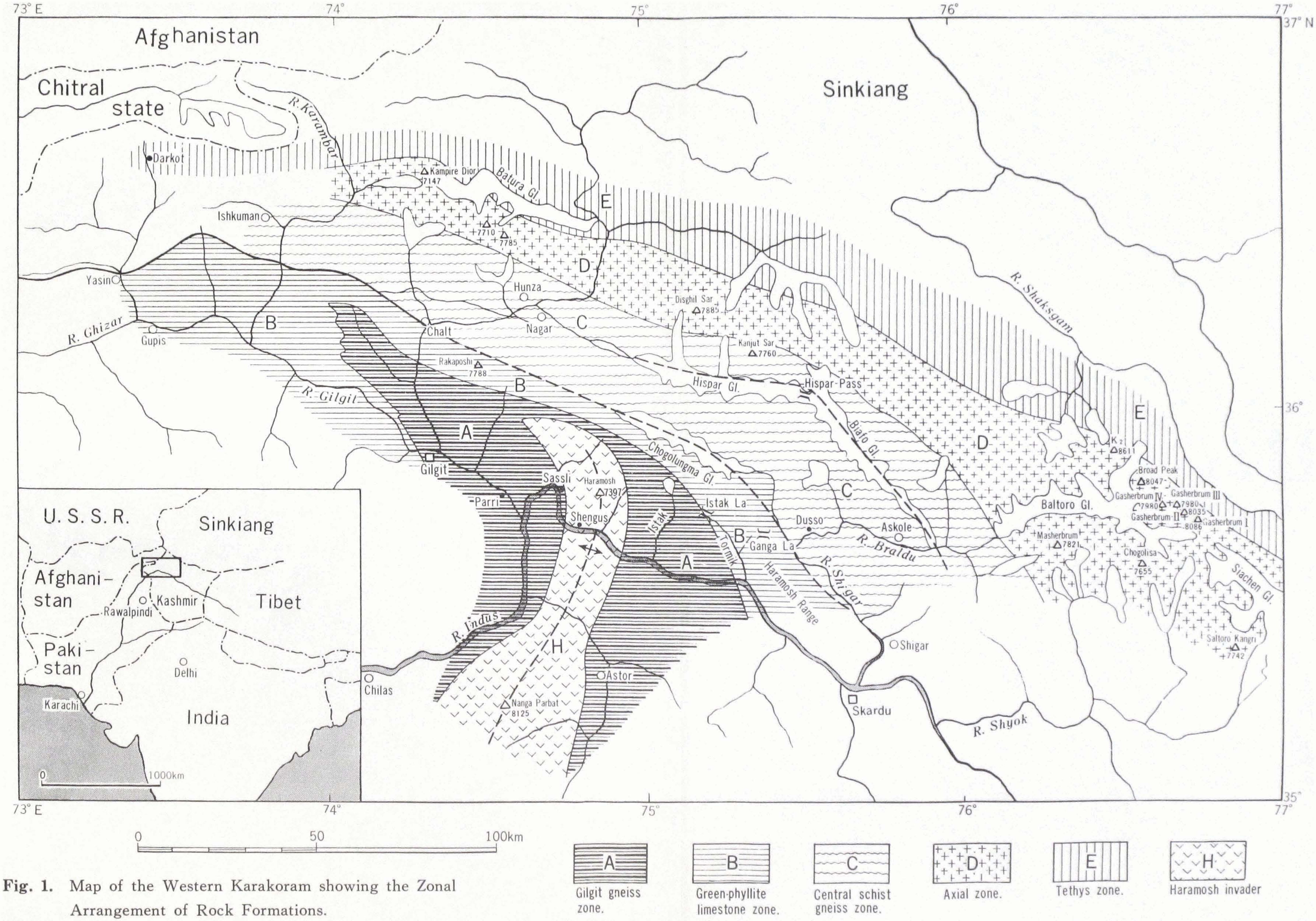

Fig. 1. Map of the Western Karakoram showing the Zonal Arrangement of Rock Formations.
By S. Matsushita and K. Huzita, 1965.

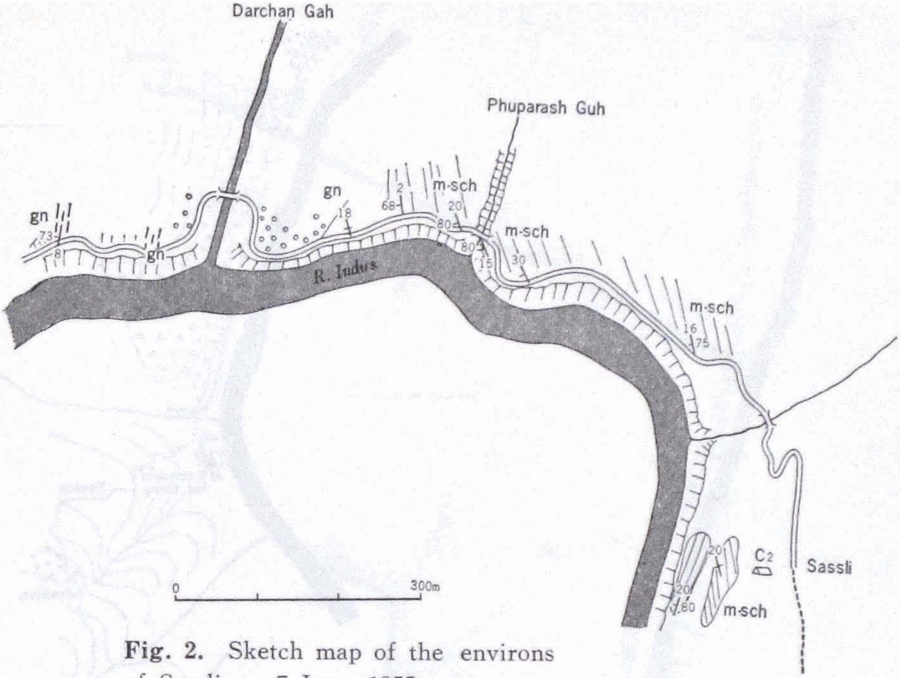

Fig. 2. Sketch map of the environs of Sassli. 7 June, 1955.

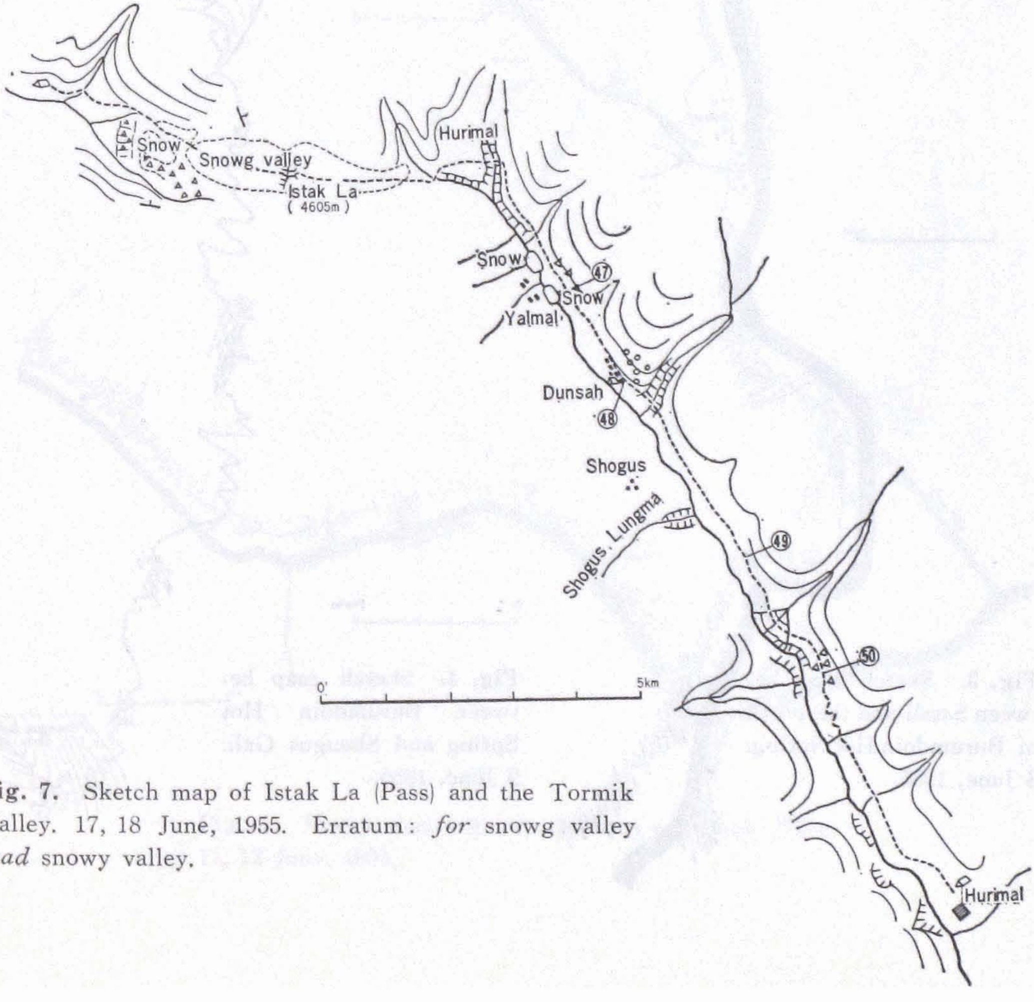

Fig. 7. Sketch map of Istak La (Pass) and the Tormik Valley. 17, 18 June, 1955. Erratum: *for* snowg valley *read* snowy valley.

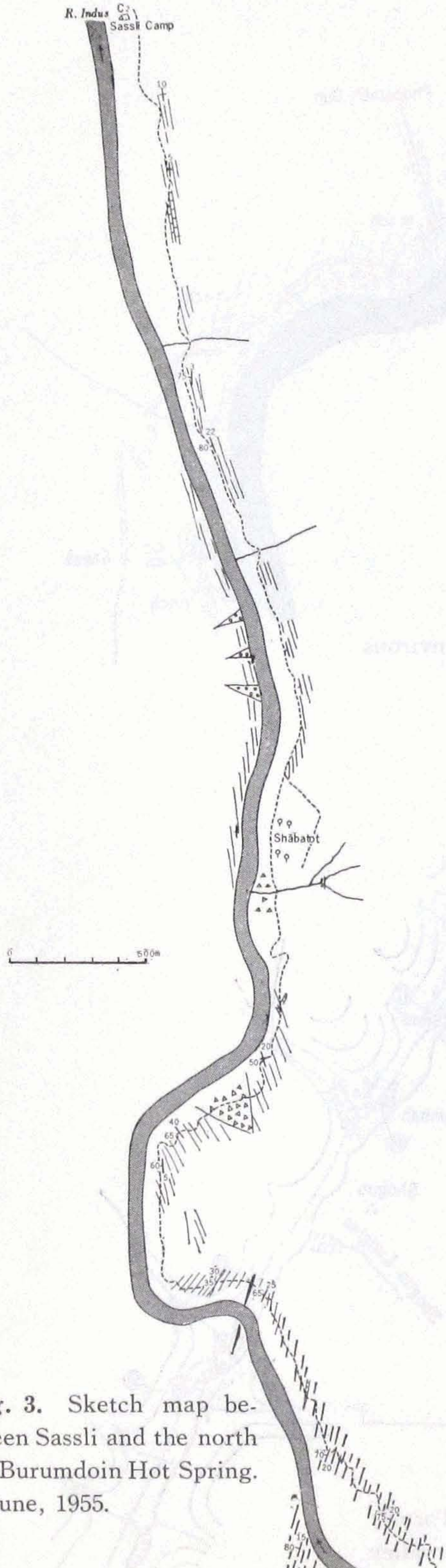

Fig. 3. Sketch map between Sassli and the north of Burumdoin Hot Spring. 8 June, 1955.

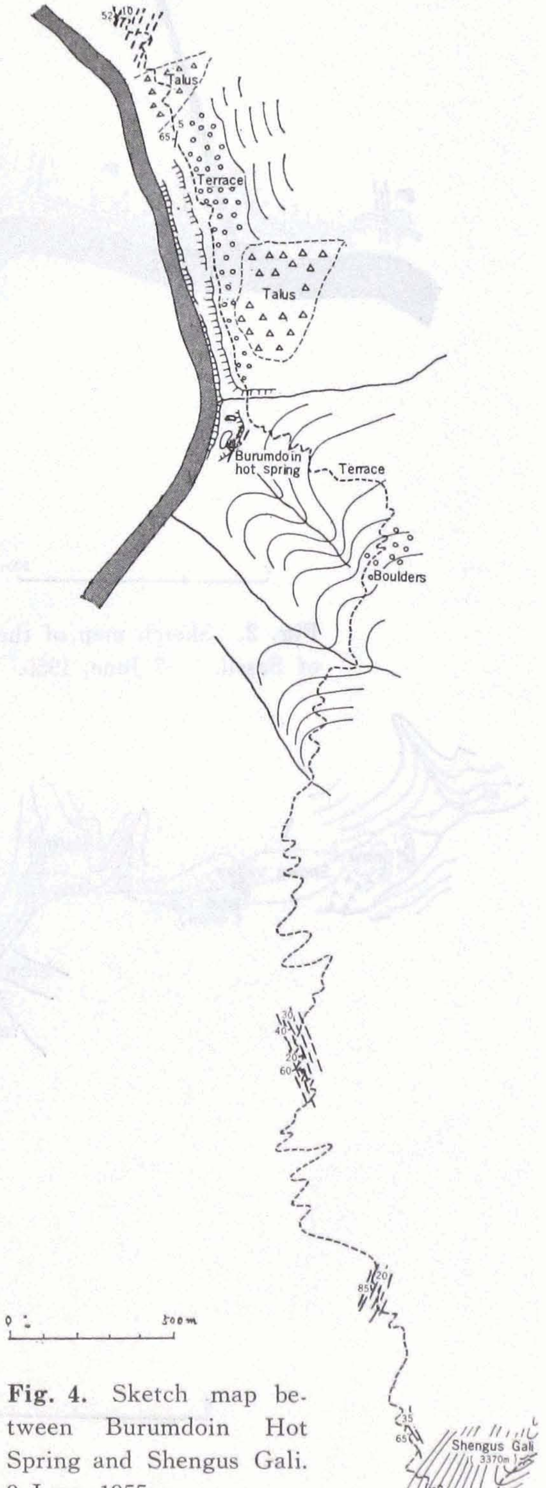

Fig. 4. Sketch map between Burumdoin Hot Spring and Shengus Gali. 9 June, 1955.

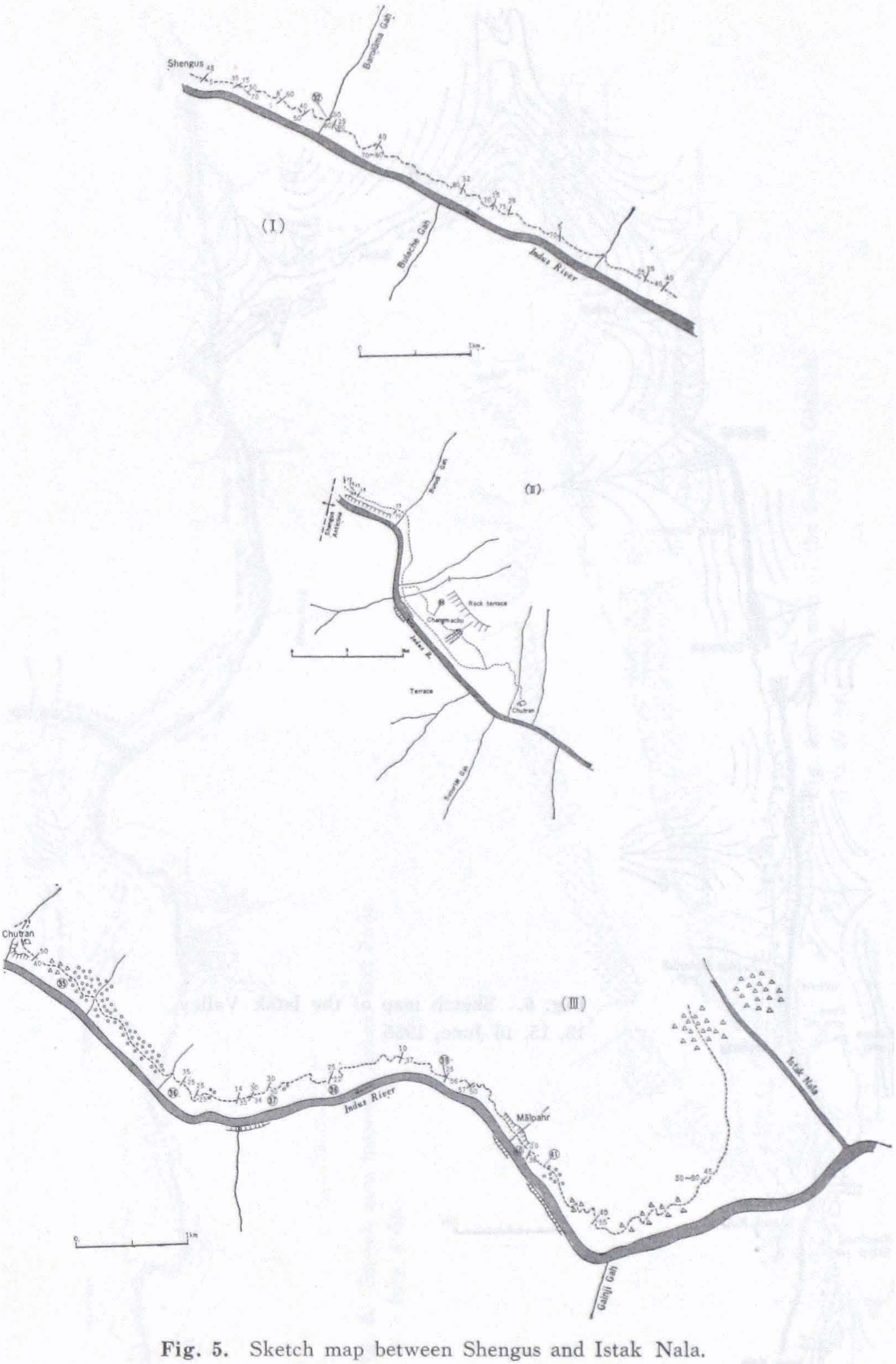

Fig. 5. Sketch map between Shengus and Istak Nala. 11, 12 June, 1955.

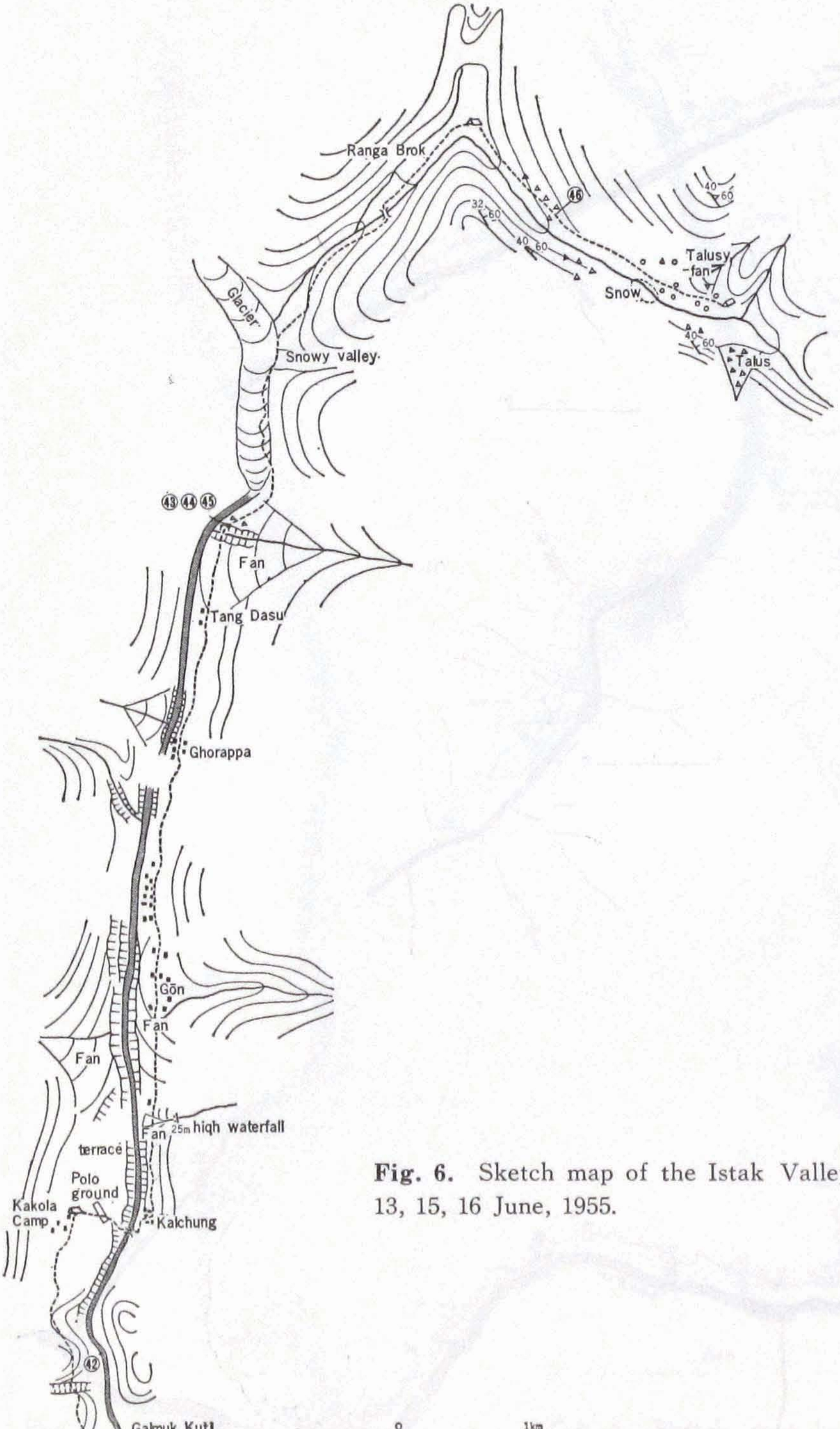

Fig. 6. Sketch map of the Istak Valley. 13, 15, 16 June, 1955.

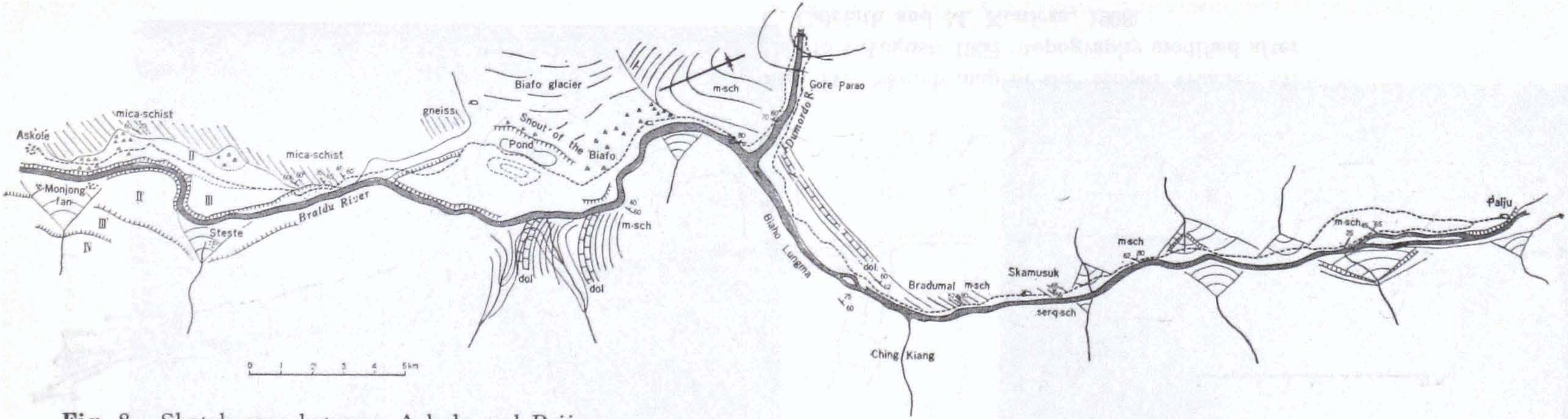

Fig. 8. Sketch map between Askole and Paiju.
4 to 7 July, 1955.

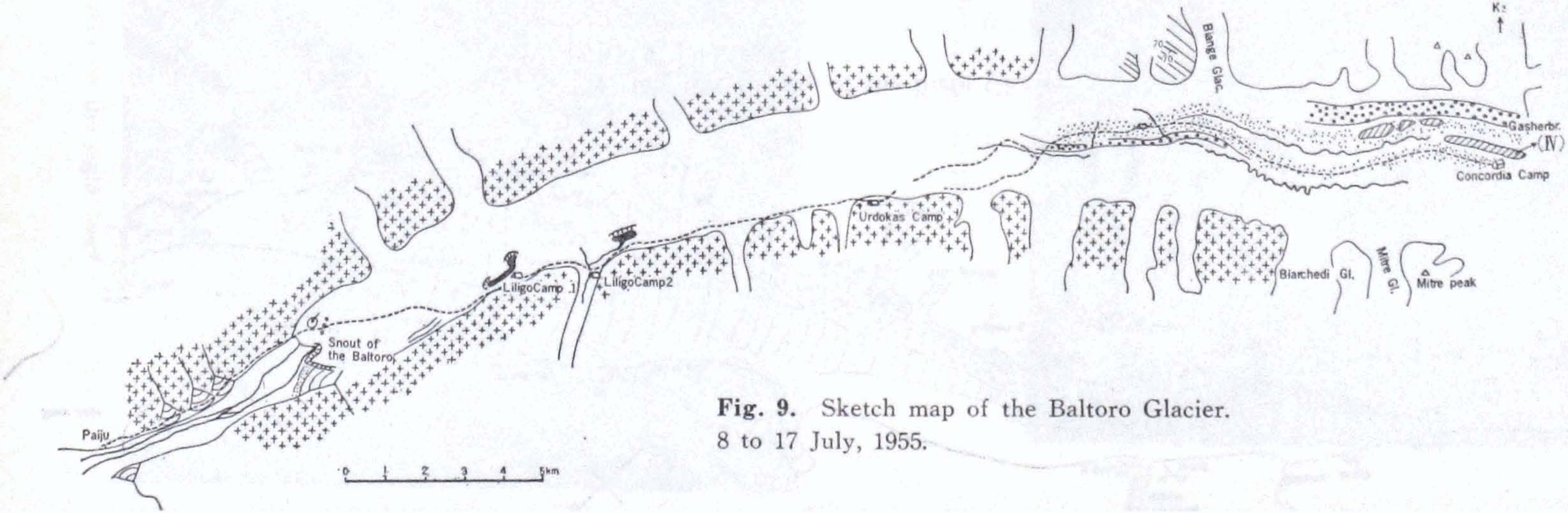

Fig. 9. Sketch map of the Baltoro Glacier.
8 to 17 July, 1955.

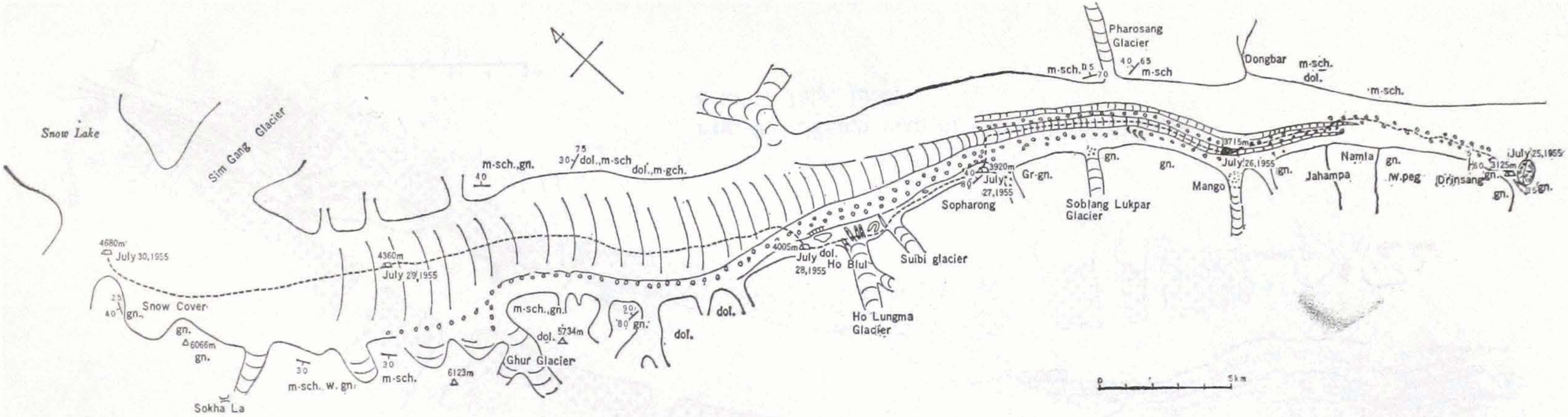

Fig. 10. Sketch map of the Biafo Glacier. 26 to 30 July, 1955.

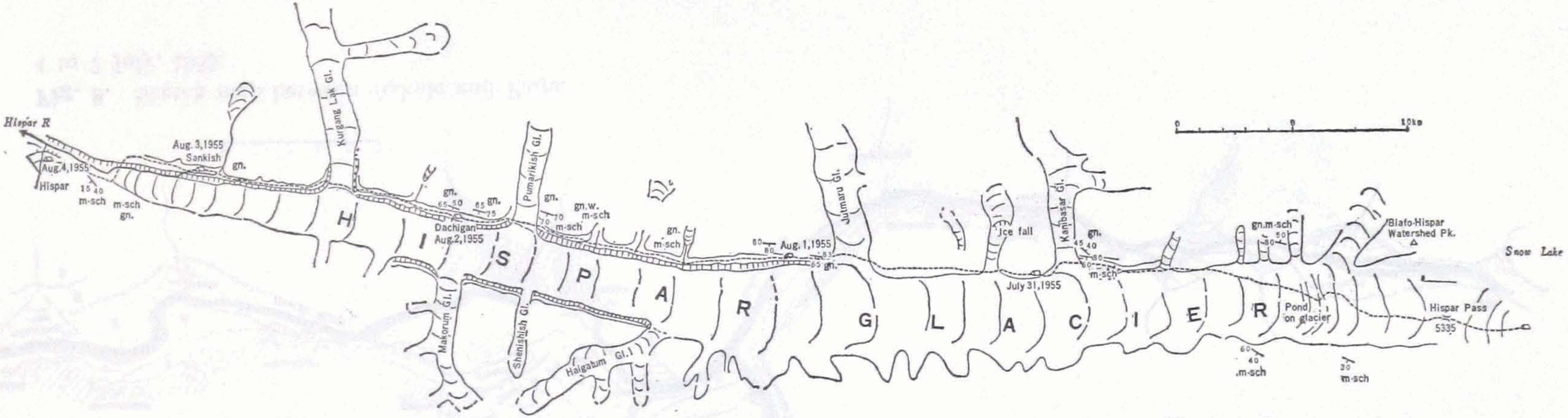

Fig. 11. Sketch map of the Hispar Glacier. 31 July to 4 August, 1955. (topography modified after C. Calciath and M. Konicza, 1908)

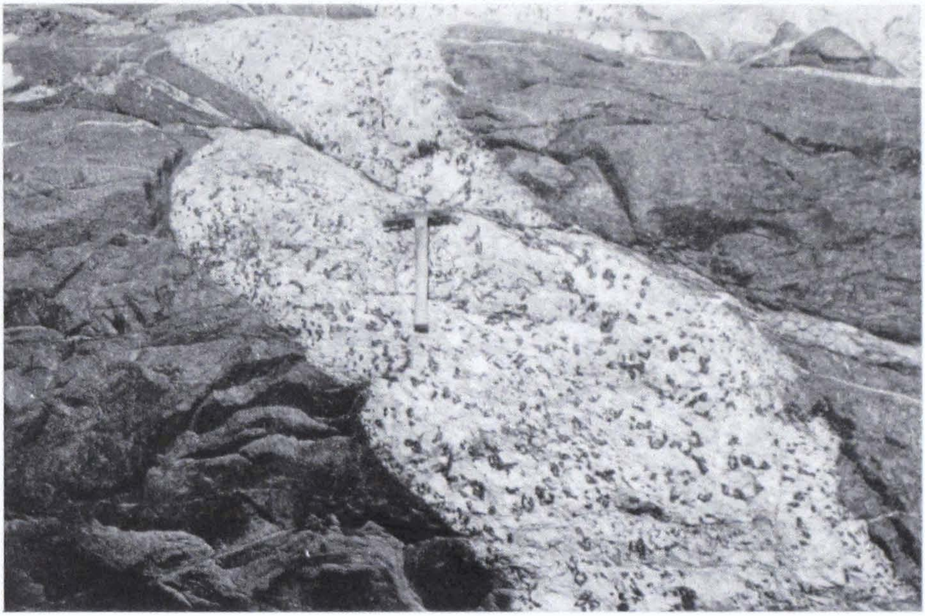

Fig. 12. Garnet-pegmatite vein cutting diorite near Shuta on the right bank of the Indus. 6 June, 1955. Photo: K. HUZITA.

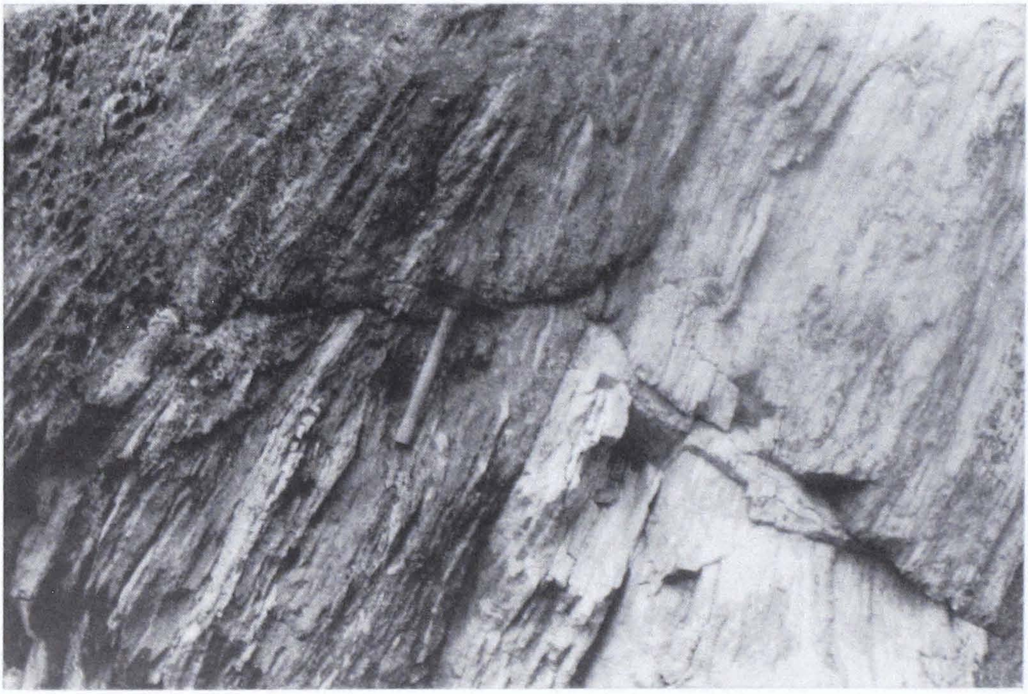

Fig. 13. Outcrop of mica-schist near Sassli on the right bank of the Indus. 7 June, 1955. Photo: K. HUZITA.

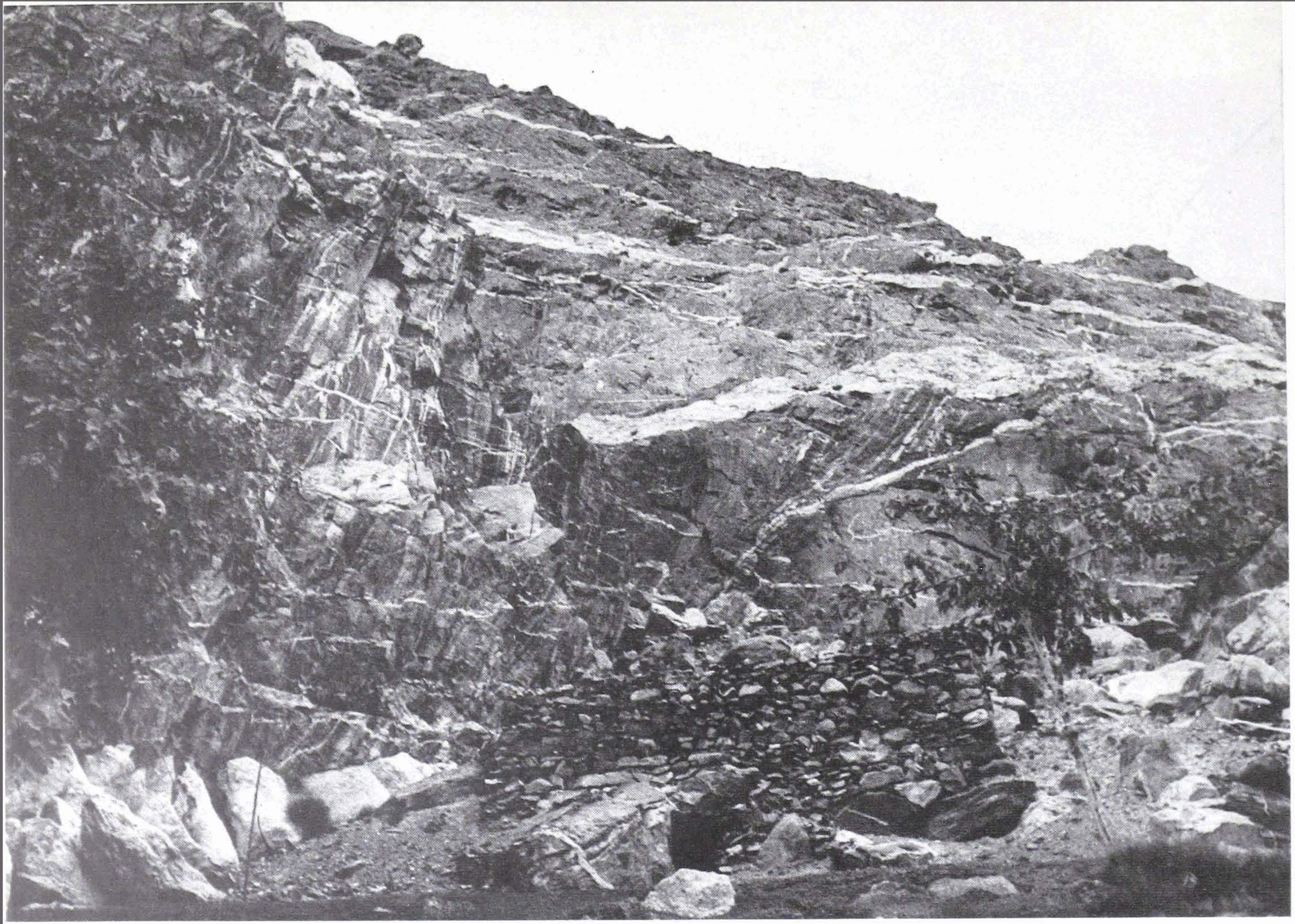

Fig. 14. Pegmatite veins in gneissose diorite near Hanuchal on the right bank of the Indus. 6 June, 1955. Photo : K. HUZITA.

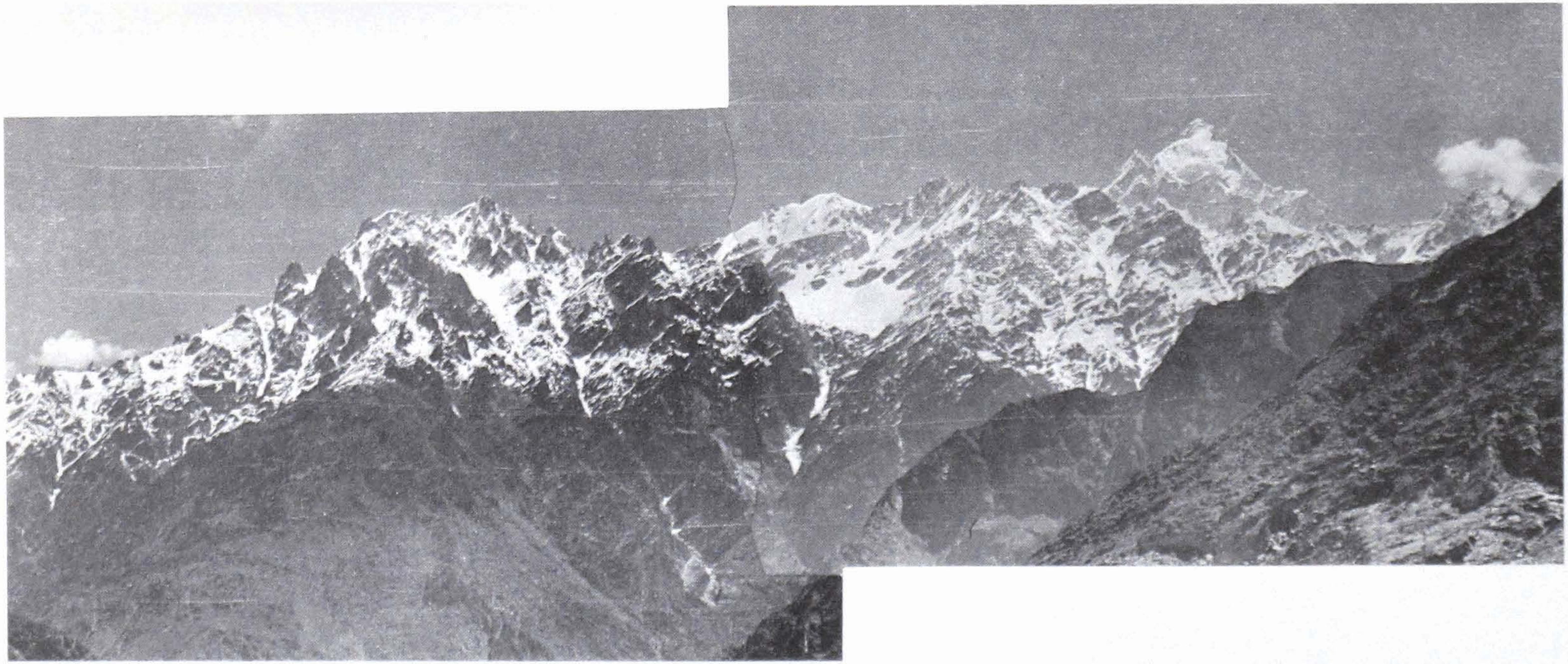

Fig. 15. Mt. Haramosh (7,397 m). Eastward view from the west of Hanuchal on the right bank of the Indus. 6 June, 1955. Photo : K. HUZITA.

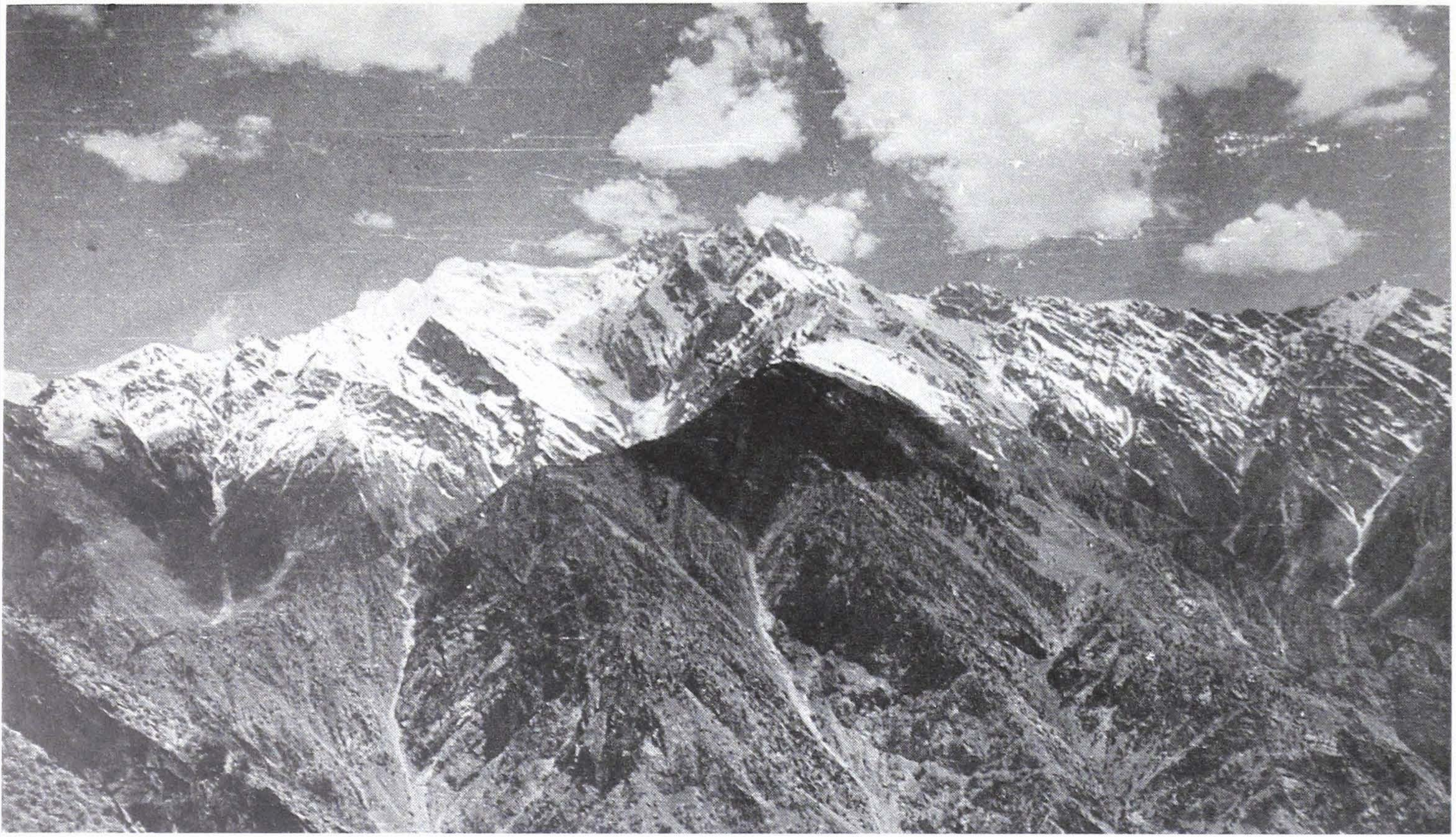

Fig. 16. Distant view of Mt. Bariokhal Shish (5,560 m) of the Deosai Mts. as seen from the vicinity of Shengus Gali (Pass). Shengus anticline is visible in Mt. Bariokhal Shisn. 9 June, 1955. Photo : HUZITA.

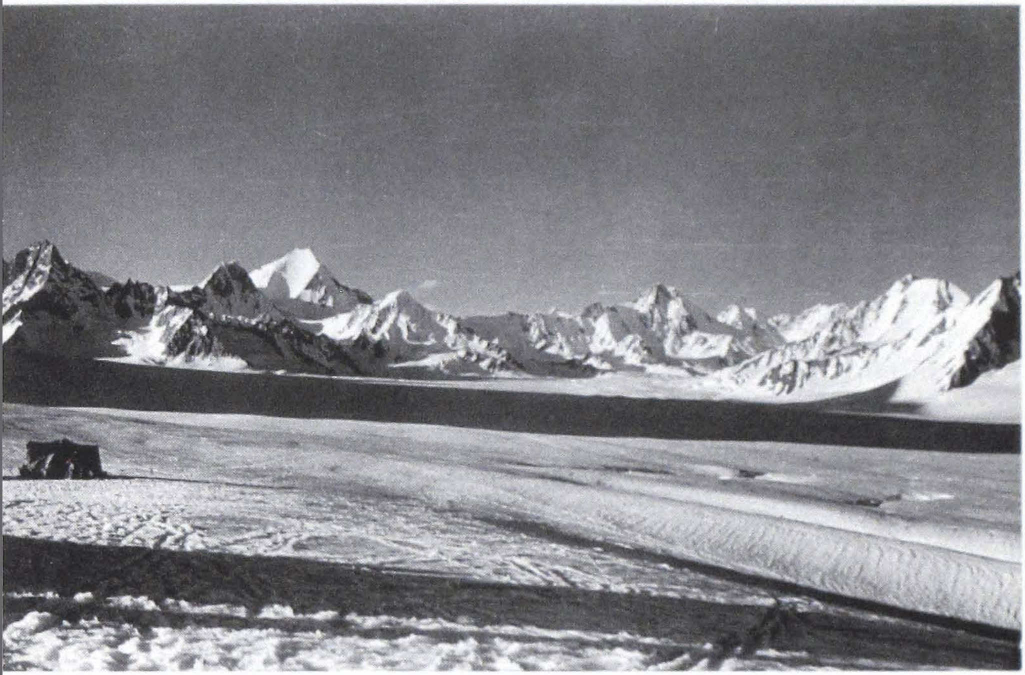

Fig. 17. Snow Lake late in the afternoon. 30 July, 1955. Photo : K. HUZITA.

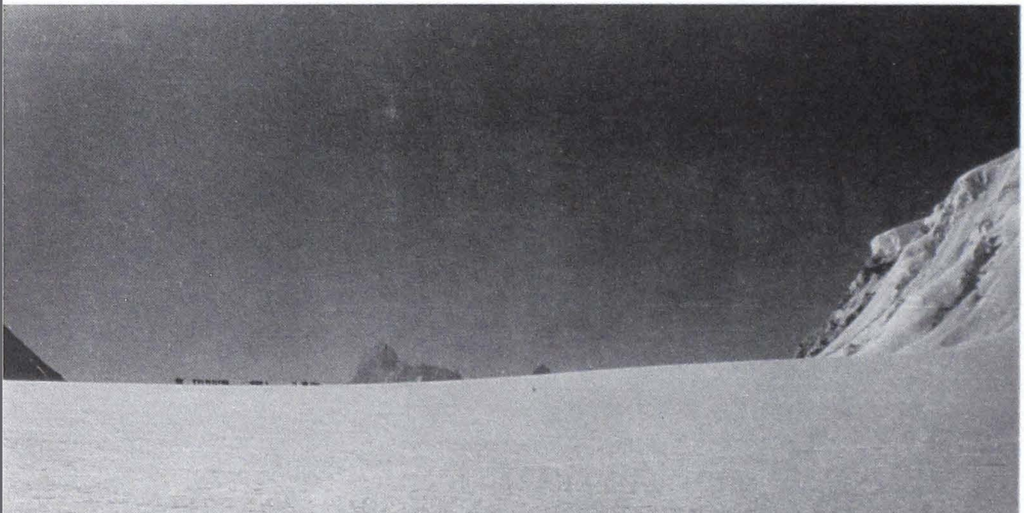

Fig. 18. Hispar Pass on the Biafo side. 31 July, 1955. Photo : K. HUZITA.

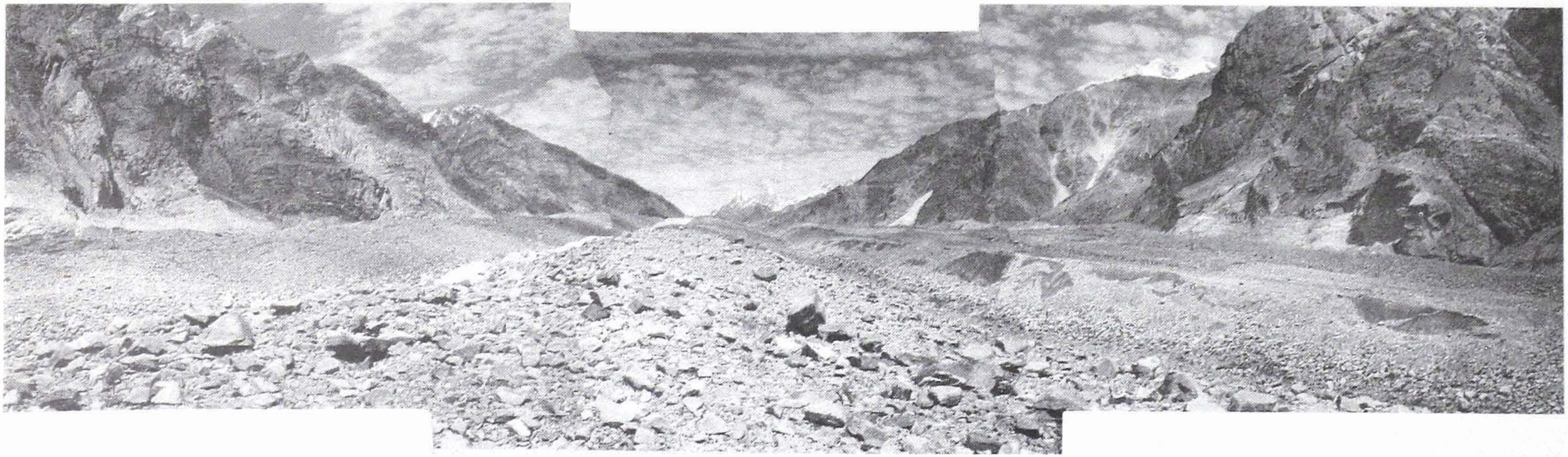

Fig. 19. The Biafo Glacier covered with moraines in its lower course as viewed from the midway between the Biafo's snout and the Mango camping place toward the upper course. Note the zonal arrangement of the moraines. 26 July, 1955. Photo : K. HUZITA.

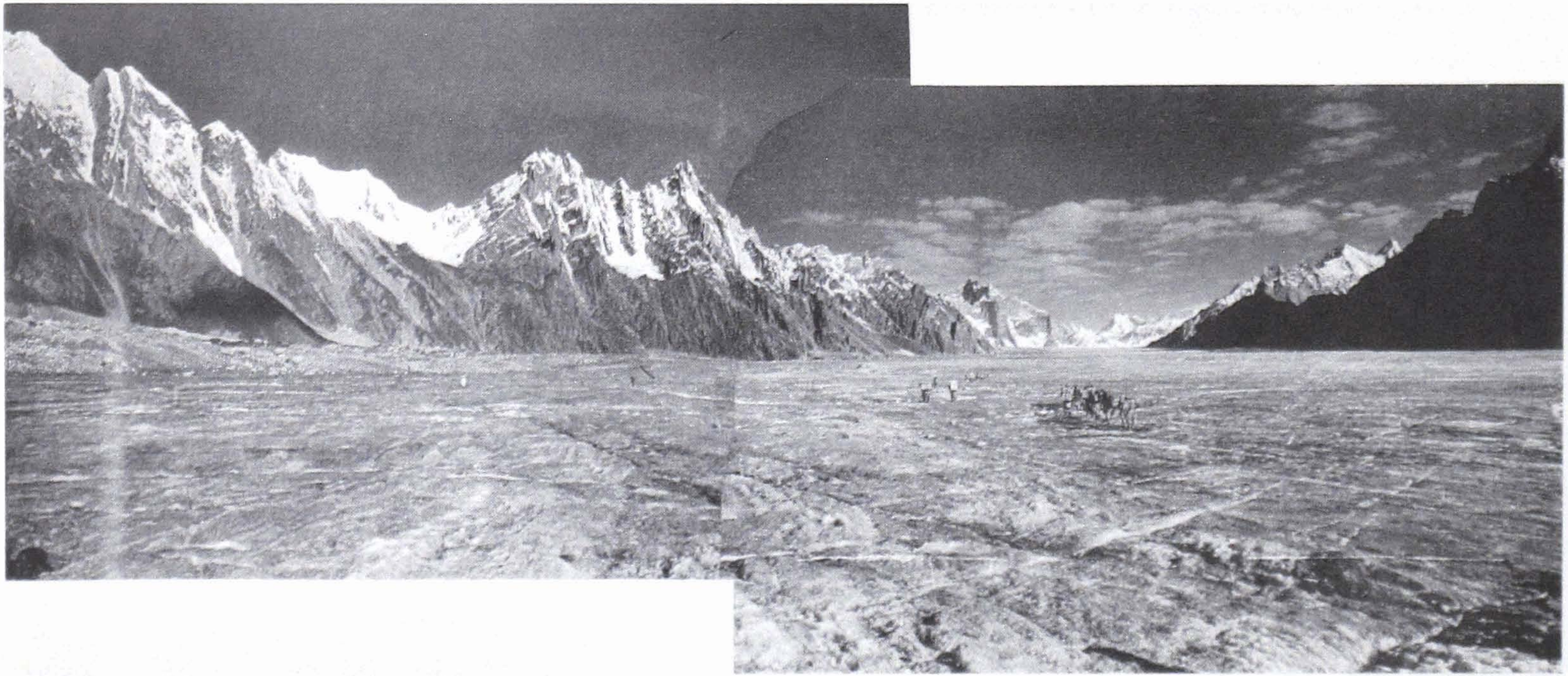

Fig. 20. The upper course of the Biafo glacier, as seen from the neighbourhood of the Ho Bluk camping place on the right bank of the glacier toward its further upper course. 29 July, 1955. Photo : K. HUZITA.

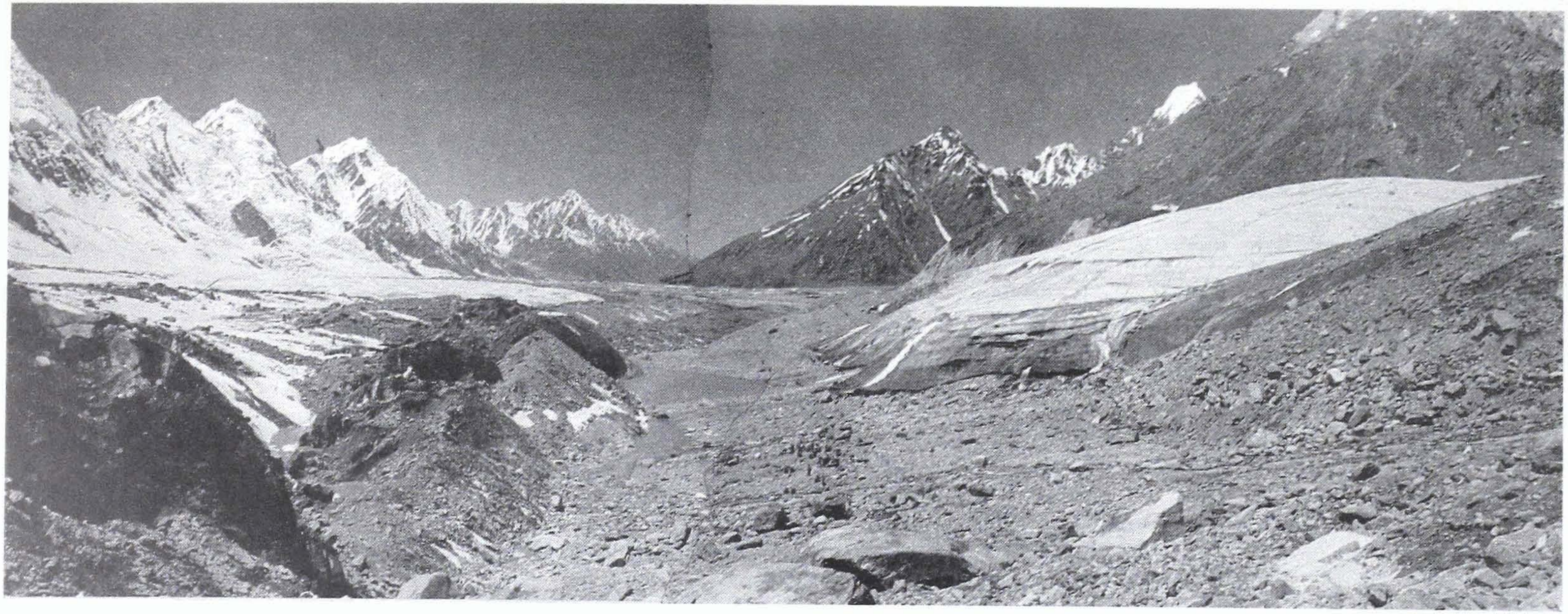

Fig. 21. Downward distant view of the upper course of the Hispar glacier as seen from the midway between the Last Moraine Glacier and the Kanibasar Glacier. Note the right lateral moraines, the right ablation valley and the snout of a small branch glacier from the north. 31 July, 1955. Photo : HUZITA.

Botany

Freshwater Algae from northeastern part of Afghanistan

By

Minoru HIRANO

The present contribution is a report of the freshwater algae, collected by Prof. R. Yosii, a member of the Kyoto University Pamir Expedition, 1960. The algae of the Pamir district and its neighbouring regions were hitherto reported by many authors, chiefly B. Petersen, F. Hustedt, N. Wille, S. Stockmayer and others. B. Petersen reported the algae based on the material of Olufsen's Second Pamir Expedition, 1898-99. Its surveying area extended from the east side of Kaspian lake to the Pamir Plateau including the Wakkham district. The reports of Hedin's Expedition deal with the materials of Central Asia and Tibet described by N. Wille and F. Hustedt respectively. The present material was brought back from an even farther southern part of the Pamir district. The writer has previously published on the algae of the Nuristan district and some parts of Afghanistan and Iran but the present material was collected from a region north of the Nuristan.

As shown by many authorities the algae of Central Asia and the Pamir district consist chiefly of many species of diatom rather than those of blue-green or green algae. This may be due to circumstances characteristic of dry climate regions. The collections were made chiefly in the mountainous areas affected by the waters of the Hindukush Mountain Range. Even the swamp area near Kabul is said to be supplied by the underground water of Hindukush Mountain Range, as pointed by Prof. S. Matsushita and R. Yosii.

The writer has analysed the chloride content of water samples preserved in the vials of these collections. The results obtained from such samples, even it was not a satisfactory result, will probably suggest the nature of the local water to some extent.

Habitat	Cl. mg/l	Habitat	Cl. mg/l
Kabul No. 1	15.56	Kaz Deh	867.03
Kabul No. 2	345.56	Quasideh Val	67.44
Kabul No. 3	22.42	Mt. Noshaq (stream)	32.77
Doab in Darwaz	39.57	Mt. Noshaq (spring)	50.06
Shiwa lake	41.37	Istrag (base camp)	53.54
Gorband at the foot of Shibar Pass	32.77		

The majority of these collections exhibit an oligohalophilous habitat especially in mountain areas of the Mt. Noshaq. The algae collected from streams and springs surrounding the base camp on the high elevation of Mt. Noshaq do not contain many components formed under stagnant circumstances but some are noticeable especially in the desmids. The desmids are, in general, found in the water of stagnant and oligohalophilous habitat therefore they are difficult to find in such a halophilous habitat in a dry climate district of Afghanistan. The writer supposes that if the desmids are distributed in Afghanistan it will be confined to the mountain area of Hindukush. In fact some of the species of desmids found in the waters of the alpine region of Mt. Noshaq will probably belong to the boreal element as the writer mentioned for the desmids found from the Nuristan area. The species are the following :

Cosmarium magnificum Nordst., C. crenatum Ralfs var. boldtianum W. & G. S. West, C. noshaquense Hirano, sp. nov., Staurastrum yoshiianum Hirano, sp. nov.

The diatoms collected from spring and stream on the alpine region of this mountain are as follows :

Diatoma hiemale (Lyngb.) Heib., D. vulgare Bory, Achnanthes coarctata (Bréb.) Gom., Stauroneis anceps Ehrenb. var. amphicephala (Kütz.) V. H., Pinnularia Brebissonii (Kütz.) Cleve, P. lata (Bréb.) W. Sm. var. pachyptera (Ehrenb.) Meister, Amphora delicatissima Krasske forma sinica Skvortzow, Cymbella cymbiformis Kütz. var. nonpunctata A. Cl., C. ventricosa Kütz., Gomphonema angustatum (Kütz.) Rabenh. var. sarcophagus (Gregory) V.H., Nitzschia palea (Kütz.) W.Sm. forma minuta A. Cl., Hantzschia amphioxys (Ehrenb.) Grun. var. capitata O. Müll., var. rupestris Grun.

At the same time it is interesting fact that Prasiola and Hydrurus species are growing frequently in the thawing water from glaciers. The collecting places in which the present study was done are listed as below :

Kabul : samples consist of 4 vials collected from different places. Two are collected on June 8, 1960 and the other two are on June 22, 1960. The collecting places were in swamps and springs near Kabul.

Pagman : two vials collected on June 18, 1960.

Gorband at the foot of Shibar Pass.

Kaz Deh : July 15, 1960.

Tilgran in Kokcha Val : July 14, 1960.

Istrag base camp : two vials collected among moss growing in the stream. One at July 20, 1960 and other on July 25, 1960.

Mt. Noshaq : spring about 3900 meters above the sea, Aug. 1, 1960.

Mt. Noshaq : three vials. The collecting places are all in the alpine region about 4000 meters above the sea. One was collected on July 20, 1960, the second was collected in the stream on August 5, and the third was collected from stones of the stream, August 22, 1960.

Spring place near base camp of Mt. Noshaq. August 3, 1960.

Quasideh Val : Angust 5, 1960.

Bottom mud of glacier lake near camp 2. August 13, 1960. No algae.

Shiwa : September 8, 1960.
Doab by Shiwa : September 10, 1960.
Doab in Darwaz : September 10, 1960.

The writer wishes to express his sincere thanks to Prof. R. Yosii of the Kyoto University for giving him the rare opportunity of studying the present collections.

CYANOPHYTA

Chroococcaceae

Merismopedia tenuissima Lemm. in Smith, Wisc. Bull. 57, p. 33, pl. 2, f. 2, 1920 ; Geitler, Krypt. Fl. 14, p. 263, f. 129a, b, 1932.

Hab. Tilgran in Kokcha Val. Distr. Afghanistan, India, Ceylon, Burma, Japan, Manchuria, Europe, N. America, and Africa.

Synechococcus aeruginosus Näg. in Geitler, Krypt. Fl. 14, p. 274, f. 133d, e, 1932.

Hab. Near Istrag base camp. Distr. Szechwan, Burma, Java, Japan, and Europe.

Oscillatoriaceae

Oscillatoria anguina (Bory) Gomont in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 173, pl. 1, f. 15, 1964.

Trichomes 8.8–9.2μ in diameter, slightly bent in one direction, attenuated toward the apex, capitate at the apex, not granulated at the cross wall ; cells short, $^1/_3$–$^1/_5$ times longer than broad.

Hab. Doab by Shiwa.

Oscillatoria angustissima W. & G. S. West in Tilden, Minn. Alg. 1, p. 76, 1910 ; Geitler, Krypt. Fl. 14, p. 965, 1932.

Hab. Doab in Darwaz. Distr. Burma, Java, Japan, Europe, and N. America.

Oscillatoria animalis Ag. in Gomont, Monogr. Oscill. p. 247, pl. 7, f. 13, 1893 ; Geitler, Krypt. Fl. 14, p. 978, f. 603a, 1932.

Trichomes straight, attenuated near the apex, apex slightly curved in one direction, 3–3.5μ in diameter ; cells quadrate, about as long as broad or a little broader, not constricted at the cross wall, without series of granules along the cross wall.

Hab. Doab in Darwaz, Tilgran in Kokcha Val, Kaz Deh. Distr. India, Burma, Ceylon, Java, Japan, Europe, and Africa.

Oscillatoria boryana Bory in Gomont, Monogr. Oscill. p. 254, pl. 7, f. 22, 23, 1893 ; Skuja, Symb. Sinica 1, p. 37, 1937.

Trichomes almost straight, tapering at the apex, slightly constricted at the cross wall and sometimes not constricted at the cross wall, apices curved in one direction or sometimes spirally twisted, each cell with a large granule (calcium carbonate). Pl. 1, f. 2, 3.

Hab. Kabul. Distr. India, Yunnan, Japan, Europe, N. America, and Africa.

Oscillatoria limosa Ag. in Tilden, Minn. Alg. 1, p. 65, pl. 4, f. 6, 1910 ; Geitler, Krypt. Fl. 14, p. 944, f. 598d, 1932.

Hab. Tilgran in Kokcha Val. Distr. Cosmopolitan.

Oscillatoria neglecta Lemm. in Krypt. Mark Brand. 3, p. 112, 1910 ; Geitler, Krypt. Fl. 14, p. 963, 1932 ; Yoneda Act. Phytotax. Geobot. 11, p. 74, 1942.

Hab. Tilgran in Kokcha Val. Distr. Burma, Yunnan, Japan, and Europe.

Oscillatoria planctonica Wolos. in Huber-Pestalozzi, Binnengew. 16 : 1, p. 235, f. 182, 1938.

Hab. Kabul. Distr. Poland.

Oscillatoria princeps Vauch. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 174, 1964.

Hab. Kabul, Tilgran in Kokcha Val.

Oscillatoria proboscidea Gomont in Monogr. Oscill. p. 209, pl. 6, f. 10, 11, 1892 ; Geitler, Krypt. Fl. 14, p. 948, f. 598b, 1932. Pl. 1, f. 4.

Hab. Tilgran in Kokcha Val. Distr. Burma, Yunnan, Ceylon, Japan, Siberia, Europe and N. America.

Oscillatoria prolifica (Grev.) Gomont in Smith, Wisc. Bull. 57, p. 51, pl. 7, f. 3-5, 1920 ; Huber-Pestalozzi, Binnengew. 16 : 1, p. 240, f. 189, 1938.

Trichomes are gradually attenuated toward the apex which is capitate at the extremity, not constricted at the cross wall, 4.4μ in diameter ; cells slightly longer than broad. Pl. 1, f. 1.

Hab. Mt. Noshaq. Distr. Europe and N. America.

Oscillatoria sancta (Kütz.) Gomont in Monogr. Oscill. p. 201, pl. 6, f. 12, 1892 ; Geitler, Krypt. Fl. 14, p. 943, f. 598c, 1932 ; Skuja, Symb. Sinica 1, p. 38, 1937. Pl. 1, f. 8.

Hab. Kaz Deh. Distr. India, Burma, Yunnan, Szechwan, Java, Japan, Europe, N. America, Africa, and Australia.

Oscillatoria subbrevis Schmidle in Bot. Jahrb. 30, p. 243, pl. 4, f. 7, 1901 ; Geitler, Krypt. Fl. 14, p. 946, f. 601b, 1932.

Trichomes straight, not constricted at the cross wall, not tapering toward the apex ; cells short, about $^1/_5$-$^1/_6$ times longer than broad.

Hab. Kabul. Distr. India, Japan, Europe, and Africa.

Oscillatoria telebriformis Ag. in Geitler, Krypt. Fl. 14, p. 954, f. 607d, 1932.

Hab. Tilgran in Kokcha Val, Shiwa, near Istrag base camp, Mt. Noshaq, and Kabul. Distr. Yunnan, Szechwan, Java, Sumatra, and Europe.

Oscillatoria tenuis Ag. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 174, pl. 1, f. 1, 1964.

Hab. Doab by Shiwa.

Spirulina maior Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 174, pl. 1, f. 5, 1964.

Hab. Doab by Shiwa.

Phormidium autumnale (Ag.) Gomont in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 175, 1964.

Hab. Doab by Shiwa.

Phormidium bohneri Schmidle in Bot. Jahrb. 30, p. 59, pl. 2, f. 11, 1901; Frémy, Arch. Bot. 3, p. 145, f. 128, 1930.

Hab. Gorband, Mt. Noshaq. Distr. India and Africa.

Phormidium corium (Ag.) Gomont in Geitler, Krypt. Fl. 14, p. 1018, f. 649b, c, 1932; Frémy Mém. Soc. Nat. Sci. 41, p. 89, pl. 23, f. 6, 1934.

Hab. Kabul. Distr. India, Nepal, Java, Japan, Europe, N. America, Africa, and Australia.

Phormidium foveolarum Gomont in Monogr. Oscill. p. 164, pl. 4, f. 16, 1892; Geitler, Krypt. Fl. 14, p. 999, f. 636b, 1932.

Trichomes somewhat contorted, slightly constricted at the joint; cells about as long as broad or a little longer, 1.3-1.7μ in diameter, cross wall without a granule.

Hab. Kabul. Distr. India, Burma, Yunnan, Japan, Europe, N. America, and Africa.

Phormidium fragile Gomont in Monogr. Oscill. p. 163, pl. 4, f. 13-15, 1892; Geitler, Krypt. Fl. 14, p. 999, f. 636c, d, 1932.

Trichomes slightly constricted at the cross wall, 2.2μ in diameter.

Hab. Near Istrag base camp. Distr. Afghanistan, Nepal, China, Burma, Japan, Europe, N. America, Africa, and Australia.

Phormidium frigidum F. E. Fritsch in Nat. Antarct. Exped. Nat. Hist. 6, p. 31, pl. 1, f. 52, 1921; Geitler, Krypt. Fl. 14, p. 997, f. 636a, 1932.

Hab. Kaz Deh. Distr. Yunnan and Antarctica.

Phormidium inundatum Kütz. in Gomont, Monogr. Oscill. p. 192, pl. 4, f. 31, 32, 1892; Geitler, Krypt. Fl. 14, p. 1019, f. 649e, 1932.

Hab. Mt. Noshaq. Distr. Cosmopolitan.

Phormidium pulvinatum Woron. in Geitler, Krypt. Fl. 14, p. 1016, 1932.

Hab. Doab by Darwaz. Distr. Europe (Caucasus).

Lyngbya aestuarii (Mert.) Liebmann in Gomont, Monogr. Oscill. p. 127, pl. 3, f. 1, 2, 1892; Geitler, Krypt. Fl. 14, p. 1052, f. 666, 1932.

Trichomes not attenuated toward the apex, 14μ in broad; cells short, about $^1/_6$-$^1/_7$ times longer than broad, granulated, blackish-blue in colour. The writer has previously reported Lyngbya Hieronymusii from Kabul swamp but the present specimens are more broader trichomes than that species and also the colour of cell content is different from it.

Hab. Kabul. Distr. Java, Sumatra, Yunnan, Europe, and Africa.

Shizothrix penicillata (Kütz) Gomont in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 176, pl. 1, f. 9, 10, 1964.

Gelatinous sheath broad but not stratified, contains about 3-4 trichomes; cells about 1.2-1.5 times longer than broad but more than twice as long as broad.

Hab. Kaz Deh.

Nostocaceae

Nodularia spumigena Mertens in Geitler, Krypt. Fl. 14, p. 866, 1932.

Hab. Kabul. Distr. Cosmopolitan.

Nostoc cfr. **sphaericum** Vauch. in Geitler, Krypt. Fl. 14, p. 850, f. 539b, 1932; Skuja, Symb. Sinica 1, p. 35, 1937.

Trichomes 4-4.5μ in broad; heterocyst 6μ in diameter, slightly longer than broad. The present specimens do not possess resting spores and are therefore undeterminable.

Hab. Kabul.

EUGLENOPHYTA

Euglenaceae

Euglena acus Ehrenb. in Lemmermann, Süssw.-fl. 2, p. 129, f. 209, 1913; Gojdics, Eugl. p. 99, pl. 11, f. 1, 1953.

Cell 132μ long and 14μ broad.

Hab. Kabul. Distr. Cosmopolitan.

Euglena tripteris (Duj.) Klebs in Skuja, Symb. Bot. Ups. 9 : 3, p. 198, pl. 23, f. 12, 13, 1948; Huber-Pestalozzi, Binnengew. 16 : 4, p. 62, f. 39, 1955.

Cell 84μ long and 17.6μ broad. Pl. 1, f. 10.

Hab. Kabul. Distr. Burma and Europe.

Euglena cfr. **tuba** H. J. Carter in Huber-Pestalozzi, Binnengew. 16 : 4, p. 43, f. 17A, 1955.

Cell 94.6μ long and 17.6μ broad.

Hab. Tilgran in Kokcha Val.

Phacus indicus Skvortzow in Huber-Pestalozzi, Binnengew. 16 : 4, p. 199, f. 248, 1955.

Cell 35μ long, 42μ with caudus and 31μ broad. Pl. 1, f. 12, 13.

Hab. Kabul, Tilgran in Kokcha Val. Distr. India, S. China, and Poland.

Phacus pleuronectes (O.F.M.) Duj. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 179, 1964.

Cell 40μ long, with caudus 48μ, and 33.5μ broad.

Hab. Kabul.

Petalomonas tricarinata Skuja in Huber-Pestalozzi, Binnengew. 16 : 4, p. 501, f. 1024, 1955.

Cells slightly smaller than the form of Skuja's description, 35-36μ long and 19.3-19.7μ broad. Pl. 1, f. 11.

Hab. Tilgran in Kokcha Val. Distr. Europe.

CHRYSOPHYTA

Heterokontae

Vaucheriaceae

Vaucheria sp. (sterile)

Filaments 61-63μ in diameter. The specimens were all in sterile state, so that it is impossible to determine. No record from Pamir district.

Hab. Spring of Mt. Noshaq.

Chrysophyceae

Hydruraceae

Hydrurus foetidus (Vill.) Kirchn. in Pascher, Süssw.-fl. 2, p. 87, f. 139, 1913; Smith, Freshw. Alg. U.S. p. 437, f. 353, 1950.

This species was collected from two places: from a spring near Kabul; from the Quasideh Val, the alpine region of Mt. Noshaq. The specimens are rich in variation. Some of the colonies are unbranched, slender, erect, and string-like, and are furnished with plenty of small branchlets in the middle part of the colony. (Plate 1, f. 14, 15.) The apical part of the colonies becomes gradually slender and ends in the apical cell. The basal part of the colony also becomes slender and spreads somewhat at the holdfast. Sometimes colonies branched equally into two parts. The inbedded cells in the gelatinous envelope are disposed in longitudinal series in the basal part but become irregular and indistinct in the median part of colony. In specimens obtained from Quasideh Val the branching takes place vertically against the main axis of colony. Mature colonies become about 54-198μ in diameter, and branchlets about 22μ in diameter, and cells 7.5-8μ in diameter. Pl. 1, f. 14, 15.

Hab. Kabul and Quasideh Val. Distr. Japan, Europe, and N. America.

Nanurus flaccidus Skuja in Symb. Sinica 1, p. 47, textf. 5, f. 1-9, 1937.

The specimens collected from Gorband of Shibar Pass seem to the writer to be similar to the species reported from Yunnan, China by H. Skuja as Nanurus by the following characters: 1. the branching takes place successfully: dichotomously or divided into two unequal parts, a main axial part and subsidiary one. 2. the elongate cell form in the basal part of thallus, while the specimens from Kabul spring are decorated by many delicate and troublesome branchlets obliquely projecting from main thallus. Breadth of thallus in the basal part 88-130μ, and cells 5-5.3μ broad and 16-17.6μ long. Pl. 1, f. 16, 17.

Hab. Gorband of Shibar Pass. Distr. Yunnan.

Diatomeae

Coscinodiscaceae

Melosira arenaria Moore in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 180, 1964.

Valves 46-48μ in diameter.

Hab. Tilgran in Kokcha Val.

Fragilariaceae

Tabellaria flocculosa (Roth) Kütz. var. ventricosa Grun. in A. Cleve, Diat. Schw. Finn. 2, p. 9, f. 302a, b, d-i, 1953.

Valves 14.5-15μ long and 8-8.5μ broad.

Hab. Kaz Deh. Distr. Europe.

Diatoma elongatum (Lyngb.) Ag. var. **tenue** (Ag.) V.H. forma **minus** Grun. in A. Cleve, Diat. Schw. Finn. 2, p. 24, f. 331, l-m, u, 1953.

Valves 25.5-26μ long and 7.7-8μ broad.

Hab. Shiwa. Distr. Europe.

Diatoma hiemale (Lyngb.) Heib. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, 1964.

Valves 20-72μ long and 8-9μ broad.

Hab. Kaz Deh, Istrag, and Mt. Noshaq.

var. **mesodon** (Ehrenb.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, pl. 2, f. 6, 1964.

Valves 17-19μ long and 8.7-9μ broad.

Hab. Kaz Deh, Mt. Noshaq, and Shiwa.

Diatoma vulgare Bory in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, pl. 2, f. 8, 9, 1964.

Hab. Kabul, Istrag, and Mt. Noshaq.

Meridion circulare Ag. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind, III, p. 181, pl. 2, f. 3-5, 1964.

Hab. Istrag and Shiwa.

Ceratoneis arcus Kütz. var. **amphioxys** (Rabenh.) Brun. in A. Cleve, Diat. Schw. Finn. 2, p. 54, f. 373, f, g, 1953.

Valves 29-40μ long and 5.6-6.4μ broad. Pl. 4, figs. 2, 10.

Hab. Doab, Kaz Deh, and Shiwa. Distr. Afghanistan and Europe.

var. **orientalis** Skuja in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, pl. 2, f. 24, 1964.

Hab. Kabul.

Fragilaria brevistriata Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, 1964.

Valves 23-24μ long and 3.5-4μ broad.

Hab. Kaz Deh.

Fragilaria capucina Desm. in Hustedt, Krypt. Fl. 7 : 2, p. 144, f. 659a-e, 1931 ; A. Cleve, Diat. Schw. Finn. 2, p. 45, f. 357a-c, 1953.

Valves 51-67μ long and 5.4-6.5μ broad.

Hab. Doab in Darwaz and Shiwa. Distr. Afghanistan and Europe.

Fragilaria construens (Ehrenb.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 182, pl. 2, f. 10, 1964.

Valves 18.7-20.4μ long and 12.8μ broad.

Hab. Doab in Darwaz, Kaz Deh, Shiwa, and Tilgran in Kokcha Val.

var. **venter** Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 182, pl. 2, f. 11, 1964.

Valves 11.4-12μ long, 6.3μ broad, and striae 15-18 in 10μ.

Hab. Kaz Deh and Tilgran in Kokcha Val.

Fragilaria pinnata Ehrenb. in Hustedt, Krypt. Fl. 7 : 2, p. 160, f. 671a-i, 1931 ; A. Cleve, Diat. Schw. Finn. 2, p. 37, f. 348a, 1953.

Valves 20-21μ long and 5-5.4μ broad. There is a form which shows the intermediate character between the var. lanzettula and the form shown by Hustedt in his figure 141b. This form corresponds to the figure illustrated by A. Mayer as var. intermedia. The specimens from Doab coincides with this form but the valves are rather longer.

Hab. Doab by Shiwa, Kaz Deh, and Istrag base camp. Distr. Afghanistan, Java, and Europe.

Fragilaria vaucheriae (Kütz) Boye-Petersen in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 183, pl. 4, f. 3, 1964.

Valves 21-30μ long, 4.5-5μ broad, and striae 13-18 in 10μ.

Hab. Doab in Darwaz.

var. **parvula** (Kütz.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 183, pl. 4, f. 7, 1964.

Hab. Kaz Deh.

Synedra acus (Kütz.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 183, 1964.

Valves 43-45μ long, 3.2μ broad, and striae 12 in 10μ. The specimens are rather smaller than the typical form of this species. Judging from the size of the valve it rather corresponds to Synedra nana var. latior but the writer determined this form to be Synedra acus by the fact that the striae of the valves are not delicate and the valves have a smooth central area.

Hab. Kaz Deh and Doab by Shiwa.

Synedra amphicephala Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 183, pl. 2, f. 12, 1964.

Hab. Istrag.

Synedra rumpens Kütz. **fragilarioides** Grun. forma **constricta** Hustedt in Arch. Hydrobiol. Suppl. 15, p. 159, pl. 10, f. 51, 52, 1937.

Hab. Doab by Shiwa, Tilgran in Kokcha Val, and Kaz Deh. Distr. Java.

Synedra ulna (Nitzsch) Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak.

Hind. III, p. 184, 1964.

Valves 120-192μ long, 6.4-7.2μ broad, and striae 9-10 in 10μ.

Hab. Kaz Deh, Doab by Shiwa, Kabul, and Tilgran in Kokcha Val.

Eunotiaceae

Eunotia tschirchiana O. Müll. in Hustedt, Arch. Hydrobiol. Suppl. 15, p. 173, pl. 12, f. 23-29, 1937 ; Foged, Det. Kong. Dansk. Vidensk. Selsk. Biol. Skrift 11:1, p. 43, 1959.

Valves 45-48μ long, 10-10.5μ broad, and striae 6 in 10μ. Pl. 3, fig. 19.

Hab. Istrag. Distr. Afghanistan, Java, and Sumatra.

Eunotia veneris (Kütz.) O. Müll. in Hustedt, Krypt. Fl. 7 : 2, p. 300, f. 766, 1932 ; A. Cleve, Diat. Schw. Finn. 2, p. 112, 1953.

Valves 37-38μ long, 6.5-7μ broad, and striae 18-20 in 10μ. Pl. 3, fig. 20.

Hab. Kabul. Distr. India, Thailand, Mongolia, Europe, N. America, W. Indies, Brazil, and E. Africa.

Achnanthaceae

Cocconeis placentula Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 187, 1964.

Hab. Istrag.

var. **lineata** (Ehrenb.) Cleve in Hustedt, Krypt. Fl. 7 : 2, p. 348, f. 802c, 1933 ; A. Cleve, Diat. Schw. Finn. 3, p. 9, f. 492, 1953.

Hab. Istrag, Kaz Deh, and Tilgran in Kokcha Val. Distr. Afghanistan, Java, Japan, and Europe.

Achnanthes coarctata Bréb. in Hustedt, Krypt. Fl. 7 : 2, p. 419, f. 872a-c, 1933.

Valves 43-45μ long, 10-10.7μ broad, and striae 10 in 10μ.

Hab. Mt. Noshaq. Distr. Afghanistan and Europe. Probably cosmopolitan.

Achnanthes flexella (Kütz.) Brun. in Hustedt, Krypt. Fl. 7 : 2, p. 415, f. 869, 1933 ; A. Cleve, Diat. Schw. Finn. 3, p. 21, f. 518a-d, 1953.

Valves 39.5-41μ long, 16.7-17μ broad, and striae 18 in 10μ.

Hab. Kaz Deh. Distr. Europe and N. America.

Achnanthes lanceolata (Bréb.) Grun. in Hustedt, Krypt. Fl. 7 : 2, p. 408, f. 863a-d, 1933 ; A. Cleve, Diat. Schw. Finn. 3, p. 25, f. 527a-e, 1953.

Hab. Istrag. Distr. Afghanistan, Java, Sumatra, and Europe.

Naviculaceae

Diploneis elliptica (Kütz.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 188, 1964.

Hab. Kaz Deh.

Stauroneis anceps Ehrenb. var. **amphicephala** (Kütz.) V.H. in A. Cleve, Diat. Schw. Finn. 3, p. 207, f. 943c, 1953.

Valves 48-51μ long, 11μ broad, and striae 15-18 in 10μ.

Hab. Mt. Noshaq. Distr. Europe.

var. **subcapitata** Oestrup in A. Cleve, Diat. Schw. Finn. 3, p. 209, f. 943n, o, 1953.

Valves 32-33μ long, 7.6-8μ broad. Pl. 2, fig. 4.

Hab. Shiwa. Distr. Sweden.

Stauroneis kriegeri Patrick in Hustedt, Krypt. Fl. 7 : 2, p. 780, f. 1126a, b. 1937.

Valves 25.5-26μ long, 5-5.3μ broad. Pl. 2, fig. 5.

Hab. Istrag. Distr. Afghanistan and Europe.

Stauroneis phoenicenteron (Nitzsch) Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 188, 1964.

Valves 74-76μ long, 18.5-19μ broad, and striae 12 in 10μ.

Hab. Kaz Deh.

Gyrosigma acuminatum (Kütz.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 189, 1964.

Hab. Kaz Deh.

Gyrosigma attenuatum (Kütz.) Rabenh. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 189, pl. 4, f. 10, 11, 1964.

Valves 238-240μ long, 30-30.7μ broad, and striae 12 in 10μ.

Hab. Kaz Deh.

Gyrosigma spenceri (W. Sm.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 189, pl. 4, f. 12, 1964.

Valves 158-162μ long and 19.8-20μ broad.

Hab. Kabul.

Caloneis bacillaris (Gregory) Cleve in A. Cleve, Diat. Schw. Finn. 4, p. 103, f. 1148a-e, 1955.

Valves 30.6-31μ long, 6.8-7μ broad, and striae 18 in 10μ. Pl. 2, fig. 8.

Hab. Tilgran in Kokcha Val. Distr. Europe.

Caloneis silicula (Ehrenb.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 189, pl. 5, f. 27, 1964.

Hab. Kaz Deh.

Neidium iridis (Ehrenb.) Cleve, Diat. Schw. Finn. 4, p. 119, f. 1174a, b, 1955.

Valves 88-90μ long, 22-22.5μ broad, and striae 12-15 in 10μ.

Hab. Kaz Deh. Distr. Pamir, Tibet, Japan, and Europe.

var. **ampliata** (Ehrenb.) Cleve in Hustedt, Süssw.-fl. 10, p. 245, f. 381, 1930.

Valves 57.6-85μ long, 16-18.7μ broad, and striae 18-20 in 10μ. Pl. 3, fig. 1.

Hab. Doab by Shiwa and Tilgran in Kokcha Val. Distr. Afghanistan, Szechwan, Japan, and Europe.

Neidium productum (W. Sm.) Cleve var. **minor** A. Cleve in Diat. Schw. Finn. 4, p. 118, f. 1171d, 1955.

Valves 46-48μ long, 13-14μ broad, and striae 18-20 in 10μ. Pl. 2, fig. 6.

Hab. Kabul. Distr. Europe.

Anomoeoneis sphaerophora (Kütz.) Pfitzer var. **sculpta** (Ehrenb.) O. Müll. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 190, pl. 3, f. 4, 1964.

Valves 59.5-61μ long, 22-23μ broad, and striae 18 in 10μ.

Hab. Kabul.

Navicula arenariaeformis Pant. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 190, pl. 5, f. 5, 1964.

Valves 44-45μ long, 9.4-10μ broad, and striae 9 in 10μ.

Hab. Kaz Deh.

Navicula cryptocephala Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 191, pl. 5, f. 12, 1964.

Valves 27-30.6μ long, 5-6.8μ broad, and striae 15-18 in 10μ.

Hab. Kaz Deh and Tilgran in Kokcha Val.

Navicula cuspidata Kütz. in Hustedt, Krypt. Fl. 7 : 3, p. 59, f. 1206a, 1961.

Valves 115.6-118μ long, 25.5-26μ broad, and striae 15 in 10μ.

Hab. Shiwa. Distr. Tibet. Yunnan, Java, Sumatra, Burma, Siberia, and Europe.

var. **ambigua** (Ehrenb.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 191, 1964.

Valves 88-92μ long, 23.7-24μ broad, and striae 12-15 in 10μ. Pl. 2, fig. 18.

Hab. Tilgran in Kokcha Val.

Navicula dicephala (Ehrenb.) W. Sm. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 191, pl. 5, f. 14, 1964.

Valves 19-21μ long, 7.2-7.7μ broad, and striae 12-13 in 10μ. Pl. 2, fig. 11.

Hab. Doab by Shiwa.

Navicula gregaria Donk. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 192, pl. 5, f. 16, 1964.

Valves 18.7-20μ long, 6μ broad, and striae 18 in 10μ. Pl. 3, fig. 7.

Hab. Shiwa.

Navicula halophila (Grun.) Cl. var. **okamurae** Skvortzow in Philip. Journ. Sci. 62, p. 200, pl. 4, f. 5, 1937.

Valves 62-64μ long, 18μ broad, and striae 18 in 10μ. The striae of the present specimens are disposed somewhat in radial and equidistant. Hustedt described the forma robusta in which the ends of valve are somewhat prostrated but the present specimens are distinguished from his form by the narrower valve. Pl. 2, fig. 17.

Hab. Kabul. Distr. Japan.

Navicula menisculus Schum. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 192, pl. 5, f. 13, 1964.

Valves 30-32μ long, 6.5-7μ broad, and striae 12-14 in 10μ. Pl. 2, fig. 15.

Hab. Doab by Shiwa.

Navicula parva (Menegh.) A. Cleve in Diat. Schw. Finn. 3, p. 130, f. 754a-d, 756g, 1953.

Valves 17.6-18μ long, 5.6-6μ broad, and striae 9-10 in 10μ. Pl. 4, fig. 8.

Hab. Doab by Shiwa. Distr. Europe.

Navicula pupula Kütz. in Hustedt. Süssw.-fl. 10, p. 281, f. 467a, 1930 ; A. Cleve, Diat. Schw. Finn. 3, p. 186, f. 890a-c, 1953.

Valves 23.7-24μ long, 6.8-7μ broad, and striae 12-15 in 10μ.

Hab. Kaz Deh. Distr. Afghanistan, Pamir, Yunnan, Szechwan, Kwantung, Burma, Java, and Europe.

var. **minuta** V. H. in A. Cleve, Diat. Schw. Finn. 3, p. 187, f. 890l, 1953.

Valves 17.8-18μ long, 6.8-7μ broad, and striae 24 in 10μ. Pl. 2, fig. 13.

Hab. Tilgran in Kokcha Val. Distr. Europe.

Navicula radiosa Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 192, pl. 5, f. 23, 1964.

Valves 68-70μ long, 12μ broad, and striae 9-10 in 10μ.

Hab. Shiwa.

var. **cuneata** A. Cleve in Diat. Schw. Finn. 3, p. 156, f. 816k, 1, 1953.

Valve somewhat variable in form, 64-77μ long, 9.6-11μ broad, and striae 9-12 in 10μ, generally linear-lanceolate, both margins sometimes almost parallel in the middle and sometimes slightly convex, gradually narrowed toward the ends or rapidly narrowed near the ends, ends rounded, central area somewhat transversely rectangular, striae radiate at the centre and convergent near the ends. The present specimens somewhat different from A. Cleve's figure by the rounded form of central area and the larger size of valve. Pl. 2, fig. 3.

Hab. Istrag. Distr. Europe.

Navicula rhyncocephala Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 193, pl. 5, f. 2, 10, 1964.

Valves 32-51μ long, 7.7-9.5μ broad, and striae 12-13 in 10μ.

Hab. Kaz Deh and Shiwa.

var. **amphiceros** (Kütz.) V. H. in A. Cleve, Diat. Schw. Finn. 3, p. 157, f. 817h-k, 1953.

Valves 43-44μ long, 10.5-11μ broad, and striae 9-10 in 10μ. Pl. 2, fig. 16.

Hab. Doab by Shiwa. Distr. Europe.

Navicula rotaeana (Rabenh.) Grun. in Hustedt, Krypt. Fl. 7 : 3, p. 200, f. 1319, 1962.

Valves 25.5-26μ long, 12μ broad, and striae 9-11 in 10μ. Pl. 2, fig. 10.

Hab. Shiwa. Distr. Central Asia, Burma, Java, and Europe.

Navicula seminulum Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 193, pl. 5, f. 15, 1964.

Valve 16μ long, 4.5μ broad, and striae 12 in 10μ.

Hab. Istrag.

Navicula wittrockii (Lagerst.) A. Cleve in Diat. Schw. Finn. 3, p. 188, 1953; Hustedt, Krypt. Fl. 7 : 3, p. 124, f. 1256, 1961.

Valve 32μ long, 7.7μ broad, and striae 9-12 in 10μ. Valve linear with parallel margins and broadly rounded ends, striae radiate, central area rhomboid. Hustedt figured the alternate length of striae in the middle part of valve but the present specimens does not alternate in the middle. Pl. 2, fig. 7.

Hab. Tilgran in Kokcha Val. Distr. Europe.

Pinnularia biceps Gregory var. **minor** A. Cleve in Diat. Schw. Finn. 4, p. 63, f. 1088k-n, 1955.

Valves 35.6-37μ long, 8-8.5μ broad, and striae 18 in 10μ.

Hab. Tilgran in Kokcha Val. Distr. Europe.

Pinnularia brebissonii (Kütz.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. III, p. 194, pl. 7, f. 6. 7, 1964.

Valves 37-43μ long, 9.3-9.6μ broad, and striae 9-12 in 10μ.

Hab. Doab in Darwaz and Mt. Noshaq.

var. **hybrida** (Grun.) A. Cleve in Diat. Schw. Finn. 4, p. 54, f. 1072 h, i, 1964.

Valves 41.5-42μ long, 10.5μ broad, and striae 9-12 in 10μ. Pl. 2, fig. 12.

Hab. Doab by Shiwa. Distr. Europe.

Pinnularia dactylus Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 194, 1964.

Valves 426-432μ long and 61.5-62μ broad.

Hab. Kabul.

Pinnularia hyperborea Cleve var. **tibetica** (Meresch.) A. Cleve in Diat. Schw. Finn. 4, p. 31, f. 1034c, 1955.

Valves 27-28μ long, 10-10.5μ broad, and striae 9-10 in 10μ. Pl. 2, fig. 14.

Hab. Shiwa. Distr. Tibet.

Pinnularia lata (Bréb.) W. Sm. var. **pachyptera** (Ehrenb.) Meister in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 194, pl. 7, f. 15, 16, 1964.

Valves 51-64μ long, 16μ broad, and costae 6 in 10μ.

Hab. Mt. Noshaq.

Pinnularia microstauron (Ehrenb.) Cleve var. **longirostris** Font. in A. Cleve, Diat. Schw. Finn. 4, p. 55, f. 1073d, 1955.

Valves 57-60μ long, 12μ broad, and striae 12 in 10μ. Pl. 2, fig. 2.

Hab. Tilgran in Kokcha Val. Distr. Europe.

Pinnularia viridis (Nitzsch) Ehrenb. var. **fallax** Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 196, 1964.

Valves 74.5-76μ long, 12μ broad, and striae 9 in 10μ.

Hab. Kaz Deh.

var. **intermedia** Cleve in A. Cleve, Diat. Schw. Finn. 4, p. 74, f. 1103c, d, 1955.

Valves 103-108μ long, 17.8-18.5μ broad, and striae 6 in 10μ. Pl. 2, fig. 1.

Hab. Shiwa. Distr. Yunnan, Japan, and Europe.

var. **mayeri** A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 196, pl. 7, f. 2. 17, 1964.

Valves 94-100μ long, 17-18μ broad, and striae 9-10 in 10μ.

Hab. Doab by Shiwa and Kaz Deh.

Cymbellaceae

Amphora coffaeiformis Ag. var. **borealis** (Kütz.) Cleve in A. Cleve, Diat. Schw. Finn. 3, p. 97, f. 685b-d, 1953.

Valves 35-37μ long, 8.5-9μ broad, and striae 18-24 in 10μ. Pl. 3, fig. 6.

Hab. Kabul. Distr. Europe.

Amphora delicatissima Krasske forma **sinica** Skvortzow in Pub. Mus. Hoangho Paiho no. 36, p. 10, pl. 2, f. 6, 1935.

Valves 16-17μ long, 4.5-5μ broad, and striae 12 in 10μ.

Hab. Mt. Noshaq. Distr. China.

Amphora libyca Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 196, 1964.

Valves 22-32μ long, 6-8μ broad, and striae 10-15 in 10μ.

Hab. Doab by Shiwa.

Amphora ostenfeldi Hustedt in S. Tibet 6, p. 142, pl. 9, f. 38, 39, 1922.

Valves 25-27μ long, 5-5.7μ broad, and striae 18 in 10μ. The outline of the valve is coincides well with the description by Hustedt but is slightly smaller. The specimens differ in some respects from the Tibetan form by the fact that the raphe of valve shows recurvation near the central area, however otherwise the specimens coincided with the Tibetan form. Pl. 3, fig. 22.

Hab. Kaz Deh. Distr. Tibet.

Amphora ovalis Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 196, 1964.

Valves 54-56μ long, 12μ broad, and striae 12 in 10μ.

Hab. Kaz Deh.

Amphora veneta Kütz. in Hustedt, Süssw.-fl. 10, p. 345, f. 631, 1930 ; A. Cleve, Diat. Schw. Finn. 3, p. 96, f. 682, 1953.

Valves 29-30μ long, 6-6.4μ broad, and striae 18 in 10μ. Pl. 3, fig. 21.

Hab. Kabul and Kaz Deh. Distr. Afghanistan, Pamir, Yunnan, Szechwan, Mongolia, and Europe.

Cymbella aequalis W. Sm. var. **subaequalis** (Grun.) Mayer in A. Cleve, Diat. Schw. Finn. 4, p. 138, f. 1199h-l, 1955.

Valves 34-35μ long, 8.5-9μ broad, and striae 12 in 10μ. Pl. 3, fig. 5.

Hab. Kaz Deh. Distr. Europe.

Cymbella affinis Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 197, pl. 8, f. 17-19, 1964.

Valves 47.6-51μ long, 10.7-12μ broad, and striae 9 in dorsal side and 12 in ventral side in 10μ.

Hab. Kaz Deh.

var. **excisa** (Kütz.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 197, 1964.

Valves 27-29.6μ long, 6.8-7.8μ broad, and striae 9 in 10μ.

Hab. Kaz Deh.

Cymbella alpina Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 197, pl. 7, f. 8, 1964. Pl. 3, fig. 4.

Hab. Istrag.

Cymbella amphicephala Näg. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 197, pl. 8, f. 11, 1964.

Valves 32-33μ long, 10.5-11μ broad.

Hab. Doab by Shiwa.

Cymbella caespitosa (Kütz.) Brun. in Hustedt, Süssw.-fl. 10, p. 359, 1930 ; A. Cleve, Diat. Schw. Finn. 4, p. 126, 1955.

Among many individuals of this species the writer found a curious form which seems to be belong to this species. The dorsal margin of its valves is distinctly excavated in the middle. Such a form the writer has reported from Afghanistan in another species "Cymbella affinia var. excisa". The present form does not show the prostrated apices of valves but simply rounded ones. Therefore the writer proposes the new name var. excisa for this form. Pl. 1, f. 9.

Hab. Istrag and Kaz Deh.

var. **auerswaldii** (Rabenh.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak, Hind. III, p. 198, pl. 9, f. 9, 1964.

Hab. Istrag.

Cymbella cistula (Hempr.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exp. Karak. Hind. III, p. 198, pl. 8, f. 13, 1964.

Valves 87-154μ long, 24-26.4μ broad, and striae 9-12 in 10μ.

Hab. Kaz Deh.

var. **crassa** (Grun.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 199, pl. 9, f. 6, 1964.

Valves 73-76μ long and 26.4-27μ broad. Pl. 3, fig. 17.

Hab. Kabul.

Cymbella cymbiformis Kütz. var. **nonpunctata** Fontell in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 199, pl. 9, f. 1, 1964.

Valves 38.4-44μ long, 9.3-10μ broad, and striae 9-10 in 10μ.

Hab. Istrag, Kaz Deh, and Mt. Noshaq.

Cymbella ehrenbergii Kütz. in Hustedt, Süssw.-fl. 10, p. 356, f. 656, 1930 ; A. Cleve, Diat. Schw. Finn. 4, p. 147, f. 1218a, b, 1955.

The ventral margin of the valve is less convex than the dorsal one, the ends prostrated and show mamillate form, central area rhomboid and rounded, striae about 9 in 10μ. The valve illustrated by Meister show a less developed form of the central area. The specimens from Kaz Deh are rather like to the figures of C. cuspidata illustrated by Meister and Mayer but the size of the present specimens is slightly larger than the European descriptions and figures. The present form does not coincide with the figure of A. Cleve, and also should be compared with C. heteropleura in a similar appearance. Valves 102-108μ long, 23.8-24.6μ broad, and striae 9-10 in 10μ. Pl. 4, fig. 1.

Hab. Kaz Deh. Distr. Pamir, Siberia (Baikal), Yunnan, Szechwan, Japan, and Europe.

Cymbella florentina (Grun.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 199, pl. 9, f. 13, 1964.

The present specimens are rather smaller than the European description, 28-31μ long, and 6μ broad, central area elliptic. A. Cleve described the forma minor but her specimens does not shown any expanded central area.

Hab. Kabul.

Cymbella gracilis (Rabenh.) Cl. var **schmidtii** A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 199, pl. 7, f. 9, 1964.

Hab. Near Istrag base camp.

Cymbella helvetica Kütz. in Hustedt, Süssw.-fl. 10, p. 364, f. 678, 1930 ; A. Cleve, Diat. Schw. Finn. 4, p. 167, f. 1258a-d, 1955.

Valves narrow-lunate, 69.7-93.5μ long, 14.5-17μ broad, and striae in ventral side 18-24, in dorsal one 18 in 10μ respectively, ventral margin almost straight and slightly tumid at the middle. The present specimens are rather more elongate than the form illustrated by Hustedt. Meister reported var. gracilis from Switzerland and the present specimens almost coincide with his form in valve outline but differ from his form by the concave side of the dorsal margin near the ends of the valves. A. Cleve shows the size of the typical form of the species as follows : the length of valves 34-85μ, but Pantczeck shows the more larger form of this species under the name of var. vaszaryi and the central area of the valves is slightly more expanded than that of the typical species. Pl. 3, fig. 18.

Hab. Kaz Deh and Tilgran in Kokcha Val. Distr. Pamir (Wakhan) and Europe.

Cymbella hungarica (Grun.) Pant. var. **grunowii** A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 199, pl. 10, f. 22, 1964.

Valves 35-36μ long and 9.5-10μ broad. Striae 9-10 in ventral and 6-7 in dorsal in 10μ respectively. Pl. 3, fig. 3.

Hab. Istrag.

Cymbella incerta Grun. var. **naviculacea** (Grun.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 199, pl. 8, f. 4, 1964.

Valves 32-46μ long, 6.4-7.7μ broad, striae 9-10 in ventral, and 6-9 in dorsal.

Hab. Istrag.

Cymbella kolbei Hustedt in Hydrobiol. 2, p. 46, f. 20-26, 1949 ; Foged, Det. K.

Dansk. Vid. Selsk. Biol. Skr. 11 : 1, p. 72, pl. 10, f. 12, 1959.

Valves 25.5-26.8μ long, 10-11μ broad, and striae 6-8 in 10μ. Pl. 2, fig. 9.

Hab. Istrag. Distr. Afghanistan and Iraq.

Cymbella naviculiformis Auersw. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 200, pl. 8, f. 7, 1964.

Valves 45-46μ long, 11-11.5μ broad. Pl. 3, fig. 2.

Hab. Kaz Deh.

Cymbella sinuata Gregory in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 201, pl. 5, f. 21, 1964.

Valves 17-21μ long, 5-6μ broad, and striae 9-10 in 10μ.

Hab. Istrag.

Cymbella stuxbergii (Cleve) Wislouch in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 201, pl. 9, f. 11, 12, 1964.

Valves 75-80μ long, 21.5-23μ broad, and striae 18-20 in 10μ.

Hab. Near Istrag base camp, Doab in Darwaz, and Istrag.

Cymbella ventricosa Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 201, pl. 9, f. 2, 7, 1964.

Valves 22.4-28μ long, 7.5-12μ broad, and striae 9 in ventral and 6 in dorsal.

Hab. Shiwa, Tilgran in Kokcha Val, Mt. Noshaq, and near Istrag base camp.

var. **semicircularis** (Lagerst.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 202, pl. 9, f. 8, 1964.

Valves 19.6-24.8μ long, 6-8μ broad, and striae 12-14 in 10μ.

Hab. Kaz Deh, Istrag, and Doab in Darwaz.

Didymosphaenia geminata (Lyngb.) M. Schmidt in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 202, pl. 4, f. 13-15, 1964.

Hab. Doab in Darwaz.

Gomphonema abbreviatum Ag. in Hustedt, Süssw.-fl. 10, p. 379, f. 722, 1930.

Valves 17-20μ long, 3.5-4μ broad, and striae 12 in 10μ. Pl. 3, fig. 15.

Hab. Near Istrag base camp. Distr. Szechwan, Japan, Europe, and Asia Minor.

Gomphonema acuminatum Ehrenb. var. **coronata** (Ehrenb.) V. H. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 202, 1964.

Hab. Kaz Deh and Tilgran in Kokcha Val.

Gomphonema angustatum (Kütz.) Rabenh. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 202, pl. 10, f. 21, 1964.

Hab. Shiwa.

var. **sarcophagus** (Gregory) V. H. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 20, 1964.

Valves 24-35μ long, 7.7-8μ broad, and striae 9-10 in 10μ. Pl. 3, fig. 10.

Hab. Mt. Noshaq.

Gomphonema constrictum Cleve var. **capitata** (Ehrenb.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 8, f. 15, pl. 10, f. 14, 1964.

Valves 32-51μ long, 9.6-12μ broad, and striae 9-10 in 10μ.

Hab. Doab by Shiwa and Tilgran in Kockcha Val.

Gomphonema gracile Ehrenb. var. **auritum** (A. Br.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 13, 1964.

Valves 27-27.5μ long, 5-5.4μ broad, and striae 12 in 10μ. Pl. 3, fig. 16.

Hab. Near Istrag base camp.

Gomphonema intricatum Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 3, 1961.

Valves 30-31μ long, 5-5.4μ broad. Pl. 3, fig. 11.

Hab. Near Istrag base camp.

var. **dichotoma** (Kütz.) Grun. in Hustedt, Süssw.-fl. 10, p. 375, 1930 ; A. Cleve, Diat. Schw. Finn. 4, p. 189, f. 1283s, 1955.

Valves 30-32μ long, 7-7.4μ broad, and striae 12 in 10μ. Pl. 3, fig. 12.

Hab. Near Istrag base camp. Distr. Tibet, Europe, and N. America.

var. **pumila** Mayer in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 12, 1964.

Valves 24-31μ long, 4.3-5μ broad, and striae 9-10 in 10μ. Pl. 3, fig. 13.

Hab. Kaz Deh, Doab in Darwaz, and Tilgran in Kokcha Val.

Gomphonema lanceolatum Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 2, 1964.

Valves 39-44μ long, 8.2-9μ broad, and striae 9-10 in 10μ.

Hab. Kabul.

Gomphonema olivaceum (Lyngb.) Kütz. var. balticum Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 204, pl. 10, f. 8, 1964.

Valves 27-30μ long, 6-7.7μ broad, and striae 9-10 in 10μ.

Hab. Doab by Shiwa.

Gomphonema parvulum (Kütz.) V. H. in Hustedt, Süssw.-fl. 10, p. 372, f. 713a, 1930 ; A. Cleve, Diat. Schw. Finn. 4, p. 177, f. 1269a-c, 1955.

Valves 19.6-22μ long, 5-7μ broad, and striae 9-10 in 10μ.

Hab. Kabul and Tilgran in Kokcha Val. Distr. Pamir. Siberia (Baikal), Tibet, Yunnan, Szechwan, Burma, New Guinea, Japan, Europe, N. America, and Africa.

Epithemiaceae

Epithemia turgida (Ehrenb.) Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 205, 1964.

Valves 48-51μ long, 9.6-10μ broad.

Hab. Doab by Shiwa, Tilgran in Kokcha Val.

Rhopalodia gibba (Ehrenb.) O. Müll. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 205, 1964.

Valves 64.6-67μ long and 8.5-9μ broad.

Hab. Kaz Deh.

Nitzschiaceae

Hantzschia amphioxys (Ehrenb.) Grun. var. **capitata** O. Müll. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 206, pl. 10, f. 17, 1964.

Valves 38-45μ long, 7.5-8μ broad, and striae 18-20 in 10μ.

Hab. Mt. Noshaq.

var. **rupestris** Grun. in A. Cleve, Diat. Schw. Finn. 5, p. 49, f. 1419v, w, 1955.

Valves 109-125μ long, 17-17.3μ broad, and striae 12 in 10μ. Pl. 4, fig. 12.

Hab. Mt. Noshaq. Distr. Pamir and Europe.

Nitzschia angustata (W. Sm.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 206, pl. 11, f. 6, 1964.

Valves 56-64μ long, 6-6.5μ broad, and striae 12 in 10μ.

Hab. Kaz Deh.

var. **antiqua** (Schum.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III. p. 206, pl. 11, f. 7, 1964.

Valves 74-80μ long, and 8μ broad.

Hab. Kabul.

Nitzschia communis Rabenh. var. **abbreviatum** Grun. in A. Cleve, Diat. Schw. Finn. 5, p. 90, f. 1503b-d, 1955.

Valves 10-12μ long, 3-3.4μ broad. Pl. 4, fig. 7.

Hab. Shiwa. Distr. Europe.

Nitzschia filiformis (W. Sm.) Hustedt in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 207, pl. 11, f. 14, 1964.

Valves 24-35μ long, 5-6.5μ broad, and striae 9-10 in 10μ.

Hab. Kaz Deh, Tilgran in Kokcha Val.

Nitzschia frustulum (Kütz.) Grun. var. **perminuta** Grun. in Hustedt, Süssw.-fl. 10, p. 415, 1930 ; A. Cleve, Diat. Schw. Finn. 5, p. 87, f. 1497e, f, k, 1955.

Valves 12.8-14μ long, 4-4.4μ broad, and striae 16-18 in 10μ. Pl. 3, fig. 14.

Hab. Near Istrag base camp. Distr. Java, Sumatra, and Europe.

Nitzschia microcephala Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 207, pl. 11, f. 17, 1964.

Valves 15-17.6μ long, and 3.7-4μ broad.

Hab. Tilgran in Kokcha Val, Istrag.

Nitzschia palea (Kütz.) W. Sm. forma **minuta** (Bleisch) A. Cleve in Diat. Schw. Finn. 5, p. 90, f. 1504b, 1955.

Valves 24-32μ long, and 3.2-4.5μ broad. Pl. 4, fig. 9.

Hab. Mt. Noshaq, Doab by Shiwa. Distr. Europe.

forma **tenuirostris** Grun. in Hustedt, Süssw.-fl. 10, p. 416, f. 801a, 1930 ; Skvortzow Philip. Journ. Sci. 61, p. 56, pl. 13, f. 2, 1936 ; A. Cleve, Diat. Schw. Finn. 5, p. 90, f. 1504c, d, 1955.

Valves 29-42μ long, 3.8-4.8μ broad. The present specimens coincided better with this form than the typical form of the species. The valve has parallel sides and elongate-prostrate ends. Pl. 3, fig. 9.

Hab. Doab by Shiwa. Distr. Japan and Europe.

Nitzschia sigmoidea (Ehrenb.) W. Sm. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 208, 1964.

Valves 176-182μ long, and 7.2μ broad. Pl. 4, fig. 6.

Hab. Kabul.

Nitzschia sinuata (W. Sm.) Grun. var. **tabellaria** Grun. in Hustedt, Süssw.-fl. 10, p. 409, f. 782, 1930 ; A. Cleve, Diat. Schw. Finn. 5, p. 67, f. 1452b, 1955.

Valves 20.4-24μ long, 7-7.7μ broad, and striae 20-21 in 10μ. Pl. 3, fig. 8.

Hab. Kaz Deh. Distr. Afghanistan, Szechwan, and Europe.

Nitzschia spectabilis (Ehrenb.) Ralfs in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 208, 1964. Pl. 4, fig. 4.

Hab. Kabul.

Nitzschia subtilis Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 208, pl. 11, f. 8, 1964.

Valves 46-47μ long, and 5μ broad.

Hab. Kabul.

Nitzschia suecica (Grun.) A. Cleve in Diat. Schw. Finn. 5, p. 80, f. 1482, 1955.

Valves 98-103μ long, and 4.6-4.8μ broad. Pl. 4, fig. 5.

Hab. Kaz Deh. Distr. Europe.

Nitzschia thermalis Kütz. var. **intermedia** Grun. in Hustedt. Süssw.-fl. 10, p. 403, 1930 ; A. Cleve, Diat. Schw. Finn. 5, p. 64, f. 1445a-c, 1955.

Valves 47.6-52μ long, and 5-6μ broad.

Hab. Shiwa. Distr. Europe.

Nitzschia tryblionella Hantzsch in Hustedt, Süssw.-fl. 10, p. 399, f. 757, 1930 ; A. Cleve, Diat. Schw. Finn. 5, p. 57, f. 1430a, b, 1955.

Valves 77-82μ long, and 22-23μ broad. Pl. 3, fig. 23.

Hab. Kabul. Distr. Afghanistan, Java, Sumatra, and Europe.

Surirellaceae

Cymatopleura solea (Bréb.) W. Sm. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 208, pl. 11, f. 9, 1964.

Valves 115-141μ long, 25.6-34μ broad, and striae 18-20 in 10μ.

Hab. Doab by Shiwa, Kaz Deh, Tilgran in Kokcha Val.

Surirella biseriata Bréb. in Hustedt, Süssw.-fl. 10, p. 432, f. 831, 832, 1930 ; Binnengew. 16 : 2, p. 496, f. 599, 1942.

Valves 110-136μ long, and 13.4-15μ broad.

Hab. Kaz Deh. Distr. Cosmopolitan.

Surirella decipiens Hustedt in Binnengew. 16 : 2, p. 508, f. 617A, 1942.

Valves 56-58μ long, 16-16.6μ broad. Pl. 4, fig. 11.

Hab. Kaz Deh. Distr. Celebes.

Surirella ovata Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 209, pl. 11, f. 16, 1964.

Valves 50.6-72μ long and 26.5-27μ broad.

Hab. Kabul.

Surirella tenuissima Hustedt, in Binnengew. 16 : 2, p. 511, f. 623A, 1942.

Valves 29-31μ long, 11-11.5μ broad. Pl. 4, fig. 13.

Hab. Shiwa. Distr. Sunda Islands, S. America.

Surirella terryana Ward. in Skvortzow Philip. Joun. Sci. 61, p. 61, pl. 16, f. 11, 1936.

Valves 47.6-48μ long, and 7.7-8μ broad. Pl. 4, fig. 3.

Hab. Shiwa. Distr. Japan.

CHLOROPHYTA

Volvocaceae

Gonium sociale (Duj.) Warming in Pascher, Süssw.-fl. 4, p. 420, f. 381, 382, 1927 ; Prescott, Alg. Great Lake Area p. 75, pl. 1, f. 22, 1951 ; Huber-Pestalozzi, Binnengew. 16 : 5, p. 623, f. 876, 1961.

Hab. Kabul. Distr. Europe, U.S.A.

Eudorina elegans Ehrenb. in Pascher, Süssw.-fl. 4, p. 440, f. 394-401, 1927 ; Huber-Pestalozzi, Binnengew. 16 : 5, p. 640, f. 889, 1961.

Hab. Kabul. Distr. Cosmopolitan.

Selenastraceae

Selenastrum bibraianum Reinsch in Brunthaler, Süssw.-fl. 5, p. 182, f. 273, 1915 ; Smith, Wisc. Bull. 57, p. 133, pl. 31, f. 6, 7, 1920.

Hab. Doab in Darwaz. Distr. India, Java, China, Manchuria, Europe, N. America, Brazil, and Africa.

Ankistrodesmus falcatus (Corda) Ralfs var. **spirilliformis** G. S. West in Brunthaler, Süssw.-fl. 5, p. 188, f. 288, 1915 ; Smith, Trans. Amer. Micr. Soc. 45, p. 182, pl. 13, f. 6, 1926 ; Krieger, Hedw. 70, p. 146, pl. 4, f. 13, 1930.

Hab. Tilgran in Kokcha Val. Distr. Siberia, Europe, Egypt, Azores, and N. America.

Hydrodictyaceae

Pediastrum boryanum (Turp.) Menegh. in Brunthaler, Süssw.-fl. 5, p. 100, f. 61a, 1915 ; Prescott, Alg. Great Lake Area p. 222, pl. 47, f. 9, pl. 48, f. 1, 3, 1951.

Hab. Tilgran in Kokcha Val. Distr. Cosmopolitan.

var. **longicorne** Racib. in Smith, Wisc. Bull. 57, p. 170, pl. 46, f. 9, 1920 ; Prescott, Alg. Great Lake Area p. 222, pl. 47, f. 10, 1951.

Hab. Doab by Shiwa. Distr. Japan, Manchuria, Europe, Greenland, U.S.A., and Africa.

Coelastraceae

Scenedesmus acutus Meyen in Nägeli, Gatt. einz. Alg. p. 92, pl. V. A. f. 2, 1849 ; Chodat, Ztschr. Hydro. 3, p. 126, f. 18, 19, 1926 ; Skuja, Hedw. 77, p. 49, pl. 1, f. 28, 29, 1937.

Hab. Tilgran in Kokcha Val, Shiwa. Distr. India, China, Europe, Greenland, and U.S.A.

Scenedesmus bijugatus (Turp.) Lagerh. var. **alternans** (Reinsch) Hansg. in Brunthaler, Süssw.-fl. 5, p. 167, f. 234, 1915 ; Grönblad, Mem. Soc. Fauna Flor. Fenn. 10, p. 270, textf. 5, f. H, textf. 4, f. 49-52, 1934.

Hab. Doab in Darwaz. Distr. Japan, Manchuria, Siberia, Europe, N. America, Brazil, New Caledonia, and Africa.

Gonatozygaceae

Gonatozygon monotaenium De Bary in Hirano, Contr. Biol. Lab. Kyoto Univ. 1, p. 22, pl. 1, f. 1, 1955.

Cells 145-163μ long, 11-11.6μ broad, and cell wall granulated.

Hab. Kaz Deh. Distr. Japan, China, Ceylon, Thailand, Burma, Sumatra, Europe, Greenland, N. America, and New Caledonia.

Desmidiaceae

Closterium lanceolatum Kütz. in Hirano, Contr. Biol. Lab. Kyoto Univ. 1, p. 38, pl. 4, f. 10, 1955.

Cells 330-396μ long, 53μ broad, and cell wall smooth.

Hab. Kabul. Distr. Japan, Manchuria, China, Siberia, Java, Pamir, Europe, N. & S. America, New Zealand, Africa, and Madagascar.

Closterium moniliferum (Bory) Ehrenb. in Hirano, Contr. Biol. Lab. Kyoto Univ. 1, p. 46, pl. 3, f. 6, 1955.

Hab. Tilgran in Kokcha Val. Distr. Cosmopolitan.

Closterium strigosum Bréb. in Hirano, Contr. Biol. Lab. Kyoto Univ. 1, p. 37, pl. 4, f. 9, 1955.

Cells 194-250μ long, 18-20μ broad, and cell wall smooth.

Hab. Kabul. Distr. Japan, Siberia, Sumatra, Pamir, Europe, N. America, Brazil, Australia, and Africa.

Gosmarium biretum Bréb. in W. & G. S. West, Monogr. Brit. Desm. 4, p. 25, pl. 101, f. 3, 1911.

Cells 48-55μ long, 45-57μ broad, and isthmus 16-22μ broad. The specimens are relatively smaller than the typical form of this species and the disposition of granules is not in vertical series. The smaller forms have already reported from Bohemia by Hansgirg and from Rumania by Teodoresco. Pl. 5, fig. 7.

Hab. Kabul. Distr. Ceylon, Europe, Nova Zembla, Spitzbergen, Greenland, and U.S.A.

Cosmarium botrytis (Bory) Menegh. var. **mesoleium** Nordst. in Borge, Ark. Bot. 28A : 6, p. 31, pl. 3, f. 47, 1936.

Cells 57-58.7μ long, 48.4-49μ broad, and isthmus 15.4-15.8μ broad. The specimens coincide with the Swedish form of this variety in dimension and granulation of cell wall. West reported var. mediolaeve from Britain. According to West this variety mediolaeve is distinguished from var. mesoleium by the lack of a central protuberance of the semicell ; by the granules just above the isthmus, and by the relatively broader semicell. Pl. 5, fig. 9.

Hab. Kabul. Distr. Europe.

Cosmarium crenatum Ralfs var. **boldtianum** (Gutw.) W. & G. S. West, Monogr. Brit. Desm. 4, p. 37, pl. 98, f. 13, 14, 1911. (as forma boldtiana)

Cells 44-47μ long, 26.5-31μ broad, and isthmus 13.2-19.8μ broad. The present specimens are much more crenated than those of the typical form of this species. Typically they have 3 (rarely 4) crenae, while the specimens from Pamir are 5-crenated and coincide with the description of specimens from Scotland reported by West. Among these crenations of the lateral margin the upper two crenae are largest than those of the others. Two or three series of crenations can be seen within the margin. This species is said to be distributed in the alpine and arctic regions. In Pamir the species was collected in the spring of 4000 metres above the sea on the slope of Mt. Noshaq. This species should be compared with Cosmarium subcrenatum var. truncatum reported from Davos by Messikommer and C. tetragonum var. heterocrenatum by West from England. Pl. 5, fig. 2.

Hab. Mt. Noshaq. Distr. Europe, Sumatra.

Cosmarium curtum (Bréb.) Ralfs in Hirano, Contr. Biol. Lab. Kyoto Univ. 2, p. 85, pl. 16, f. 20, 1956.

Cells slightly constricted in the middle, 40-51μ long, 21-24μ broad, and isthmus 17.6-21μ broad ; the broadest part of semicell is lied just above the isthmus, gradually and rapidly attenuated towards the apex which is narrow and slightly flattened. This species resembles C. globosum and C. cucurbita but is distinguished by the prominent attenuation of the semicell from these allied species. Pl. 5, fig. 5.

Hab. Mt. Noshaq. Distr. India, Burma, Thailand, Borneo, Japan, Siberia, Europe, Nova Zembla, Greenland, Spitzbergen, N. America, and W. Indies.

Cosmarium formosulum Hoff. in Hirano, Contr. Biol. Lab. Kyoto Univ. 5, p. 197, pl. 28, f. 25, 1957.

Cells 36-44μ long, 32-34μ broad, and isthmus 10-11μ broad. The apex of the specimens has four crenations and the lateral margin is 6-crenated, its upper 3 crenations are larger than those of the others. The cell wall is furnished with marginal series of granules and among then the outer two series are bigranulated and then become a single granule. The granulate tumour in the centre of the semicell consists of 4-5 series of granules. Pl. 5, fig. 6.

Hab. Kabul. Distr. Japan, Manchuria, S. China, Europe, Iceland. and S. Africa.

Cosmarium granatum Bréb. in Hirano, Contr. Biol. Lab. Kyoto Univ. 4, p. 129, pl. 20, f. 25, 1957.

Cells 42-44μ long, 28.6-30μ broad, and isthmus 8-9.7μ broad.

Hab. Doab in Shiwa, Tilgran in Kokcha Val. Distr. Cosmopolitan.

Cosmarium infirmum Grönblad in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 214, pl. 12, f. 18, 1964.

Hab. Doab in Shiwa. Distr. Afghanistan and Europe.

Cosmarium magnificum Grönblad, Act. Soc. Faun. Flor. Fenn. 49, p. 31, pl. 6, f. 40, 1921.

Cells large, 1.5 times longer than broad, 127-142μ long, 84-92μ broad, and isthmus 30-32μ broad ; semicells truncate-pyramidate, apex broad, truncate and straight, lateral margin convex and convergent, cell wall is furnished with marginal series of granules, series 5-6 can be seen within the margin, central part of semicell covered with granules which are disposed irregularly, between the granules with punctulations. Side view of semicell ovate. Pl. 5, fig. 8.

Hab. Spring on the slope of Mt. Noshaq. Distr. Europe.

Cosmarium margaritiferum Menegh. in Hirano, Contr. Biol. Lab. Kyoto Univ. 5, p. 190, pl. 28, f. 3, 1957.

Cells 45-52μ long, 35-42μ broad, and isthmus 11-13μ broad.

Hab. Doab by Shiwa. Distr. Japan, Siberia, Europe, Iceland, Greenland, N. America, Brazil, New Zealand, and Azores.

Cosmarium noshaquense Hirano, sp. nov.

Cellulae parvae, cylindricae, circiter $1^1/_3$ longiores quam latiores, paulo constrictae, sinu late aperto sed acuto ad apicem ; semicellulae aliquantum angulari-semiellipticae, marginibus inaequaliter et prominente 8-undulatis, basis aliquantum angustioribus, marginibus inferioribus duobus majoribus quam marginibus superioribus primus, apicibus semicellularum angustis rectis vel leviter convexis, angulis apicalibus, lateralibus et basalibus obtusis omnibus ; a latere et vertice visae circulares ; membrana glabra. Cellula 41.4μ long, 26.4μ lat., 24.2μ lat. isth. Pl. 5, fig. 4.

Hab. Mt. Noshaq.

Cosmarium obtusatum Schmidle in Hirano, Contr. Biol. Lab. Kyoto Univ. 4, p. 117, pl. 19, f. 5, 11, 1957.

Cells 57-62μ long, 47-48μ broad, and isthmus 14-15μ broad.

Hab. Tilgran in Kokcha Val. Distr. Japan, Manchuria, China, Siberia, Europe, N. America, and Africa.

Cosmarium phaseolus Bréb. forma **minor** Boldt in Hirano, Contr. Biol. Lab.

Kyoto Univ. 2, p. 104, pl. 19, f. 21, 1956.

Cells 17.6–18μ long, 13.2–14μ broad, and isthmus 3.5–4μ broad. The present specimens do not exactly coincide with Grönblad's original figure. The semicells are somewhat subhexagonal and the cells are proportionally longer in ratio of length to broad. The upper lateral margin is slightly longer than lower one. Also the specimens are distinguished from Cosmarium sexangulare by having an unequal length of upper and lower lateral margin (upper lateral margin longer than lower one) and by having rounded lateral angles of the cell. The apices of the specimens are not truncate but are slightly convex so that the present specimens seem to be showing an intermediate form between Cosmarium phaseolus forma minor and C. sexangulare forma minima. Pl. 1, f. 7.

Hab. Doab in Darwaz. Distr. Japan, Siberia, Europe, and Greenland.

Cosmarium reniforme (Ralfs) Arch. in Hirano, Contr. Biol. Lab. Kyoto Univ. 5, p. 175, pl. 26, f. 5, 1957.

Cells 48.4–52μ long, 41.8–43.5μ broad, and isthmus 15.4–16μ broad.

Hab. Tilgran in Kokcha Val. Distr. Japan, Manchuria, Siberia, Borneo, Europe, Greenland, Spitzbergen, and N. & S. America.

Cosmarium sakatoanum Hirano, sp. nov.

Cellulae parvae, aliquantum octogonales, profunde constrictae, sinu angusto-lineari ; semicellulae paululum irregulariter pyramidato-rectangulares, partibus inferioribus semicellularum rectangularibus, marginibus lateralibus bene convexis, angulis basalibus rotundatis, marginibus lateralibus superioribus convergentibus et valide retusis, partibus superioribus semicellularum elevatis et subtriangularibus, apice angusto et convexo, angulis apicalibus rotundatis ; semicellulae a vertice visae angusto-ellipticae sine inflatione mediana ; a latere visae subcirculares ; membrana glabra, cellula 20μ long., 18.4μ lat., lat. isth. 4.4μ. Pl. 5, fig. 3.

Hab. Kabul.

The present species apparently resembles Cosmarium clepsydra but the semicells have a more prominently protruded apex and the lower lateral margins are broadly rounded. Vertical view of semicells without any median inflation on each side in contrast with C. clepsydra. Turner has already reported Cosmarium orientale and C. aequale from India but both species are larger in size than the present species. Moreover C. orientale is without median inflation while on the contrary C. aequale has an inflation on each side of the semicell. The present species might have been allied to C. orientale, and C. aequale should be compared with C. clepsydra.

Cosmarium subcrenatum Hantzsch in Hirano, Contr. Biol. Lab. Kyoto Univ. 5, p. 194, pl. 28, f. 18, 1957.

Cells 26.4–28μ long, 23.8–25μ broad, and isthmus 6.2–7μ broad. The central granulated tumour of the present specimens consists of 3 series of granules while in British forms it consists of 5–7 series. West reported the form as having a reduced series of granules in his monograph. The lateral crenations are prominent in upper part but reduced in lower ones. Pl. 1, f. 6.

Hab. Tilgran in Kokcha Val. Distr. Cosmopolitan.

Cosmarium subreinschii Schmidle in Flora 78, p. 59, pl. 7, f. 24, 1894.

Cells 18.5-19.6μ long, 16.7-17.4μ broad, and isthmus 4.4-5μ broad. The present specimens correspond to the middle figure of Schmidle's three figures (fig. 24a). Schmidle's figures suggest that the semicells are variable in ratio of length to breadth, and in the width of the apex. The specimens from Pamir show an octagonal shape of the semicell and each side of the margin of the semicell is equal in length while the original figure given by Schmidle shows that the apex of semicell is longer than other lateral margin. This species resembles Cosmarium undulatum var. crenulatum figured by West in the outline of the semicell but differs from it by the possession of a papilla in the middle of the semicell and the smaller size of cell. Insam & Krieger reported C. crenulatum var. tumidulum from Tirol. That species and C. subreinschii given by Schmidle seem to the writer to be the same one. The present species should be compared with C. impressulum. The lowermost lateral margins of C. impressulum are disposed vertically against the sinus and are parallel each other while the both sides of C. subreinschii are not vertical but are divergent. There is no inflation or papilla in the middle of semicell of C. impressulum and the size of cells is larger than those of C. subreinschii. Messikommer reported C. impressulum var. alpicolum from Switzerland which resembles the present species but is larger in size and has no papilla in the median part of semicell. Pl. 1, f. 5.

Hab. Tilgran in Kokcha Val. Distr. Europe.

Cosmarium vexatum West in Hirano, Contr. Biol. Lab. Kyoto Univ. 5, p. 192, pl. 28, f. 12, 1957.

Cells 44-46μ long, 38-39.6μ broad, and isthmus 12.5-13.2μ broad.

Hab. Tilgran in Kokcha Val. Distr. Japan, Siberia, Asia Minor, and Europe.

Staurastrum punctulatum Bréb. in Hirano, Contr. Biol. Lab. Kyoto Univ. 7, p. 299, pl. 38, f. 13, 1959.

Cells 46.2-48.4μ long, 39.6-41.4μ broad, and isthmus 13-15.4μ broad.

Hab. Mt. Noshaq. Distr. Cosmopolitan.

Staurastrum yosiianum Hirano, sp. nov.

Cellulae submediocres, cylindricae, in fronte visae subellipticae, circiter 1.5 longiores quam latiores, paululum constrictae ad medium, sinu aperto et depressioni ; semicellulae semiellipticae cum basis corporum angustioribus, marginibus undulatis, apice paulum recto ; a vertice visae triangulares, angulis obtusis et paululum rotundatis, lateribus valde convexis ; membrana granulata ; cellula 44μ longa, 31μ lata, lat. isth. 29μ. Pl. 5, fig. 1.

Hab. Mt. Noshaq.

The present species seems to be one of the arctic-boreal element. Its cylindrical cell and less constricted isthmus belong to the writer's classified group "Sect. Cylindriastrum" including Staurastrum capitulum, St. pileolatum and others. Its chief distributional regions are circumpolar and alpine regions of the world. The present species was found at the spring in high elevation of 4000 meters above the sea on the slope of Mt Noshaq. In water from the same spring the writer found the large form of Staurastrum punctulatum which has world wide distribution. The dimensions of the present specimens of St. punctulatum are larger than those of the European and other regions. But its dimensions only correspond to the form reported from the arctic regions by Nordstedt.

Ulotrichaceae

Ulothrix zonata (Weber & Mohr) Kütz. in Heering, Süssw.-fl. 6, p. 35, f. 35, 36, 1914 ; Prescott, Alg. Great Lake Area p. 97, pl. 6, f. 14, 1951.

Filaments have a dilated holdfast ; basal cell of filament elongated and cylindrical, about 4 times longer than broad, 88μ in length and 22μ in diameter ; cells of median part of filament disciform, about $^1/_2$-$1^1/_2$ times longer than broad, 18-31μ in length and 35-53μ in diameter.

Hab. Spring of Kabul. Distr. Japan, Yunnan, Pamir, Central Asia, Europe, and N. America.

Prasiolaceae

Prasiola formosana Okada in Hirano, Faun. Flor. Nep. Himalaya 1, p. 15, pl. 8, f. 4-6, 1955.

Hab. Borax. Distr. Formosa (Taiwan), Yunnan.

The specimens obtained from the northeastern part of Afghanistan seem to show some variations. The form of thallus is generally elongate-ovate or bamboo-leaf in shape having an acute narrow apex and a strongly waved margin. However some specimens show a broad ovate appearance like Prasiola japonica. The holdfast of thallus is not always sited at the basal end of thallus and is sometimes sited inside of the margin near the base. The thallus solitary or sometimes in groups of 3-5 or more. The breadth of the section of the thallus does not coincide with the previous measurements reported by Okada, Skuja and writer himself. The writer's measurements show an intermediate size between Prasiola formosana and Pr. japonica as follows :

	Breadth in the section of thallus	Length of cells in cross section	Breadth of cells in cross section	Ratio of length to breadth
Pr. japonica	19-23μ	9-11μ	4-7μ	2
Pr. formosana	25-30μ	16-21μ	2-6μ	3
Present specimens	19.8-26.4μ	16.7-19.8μ	4.4-7.8μ	ca. 2.3

Plate 1.

1. Oscillatoria prolifica (Grev.) Gomont
2, 3. Oscillatoria boryana Bory
4. Oscillatoria proboscidea Gomont
5. Cosmarium subreinschii Schmidle
6. Cosmarium subcrenatum Hantzsch
7. Cosmarium phaseolus Bréb. forma minor Boldt
8. Oscillatoria sancta (Kütz.) Gomont
9. Cymbella caespitosa (Kütz.) Brun. var. excisa Hirano
10. Euglena tripteris (Duj.) Klebs
11. Petalomonas tricarinata Skuja
12, 13. Phacus indicus Skvortzow
14, 15. Hydrurus foetidus (Vill.) Kirchn.
16, 17. Nanurus flaccida Skuja 16. cells in the basal part of thallus

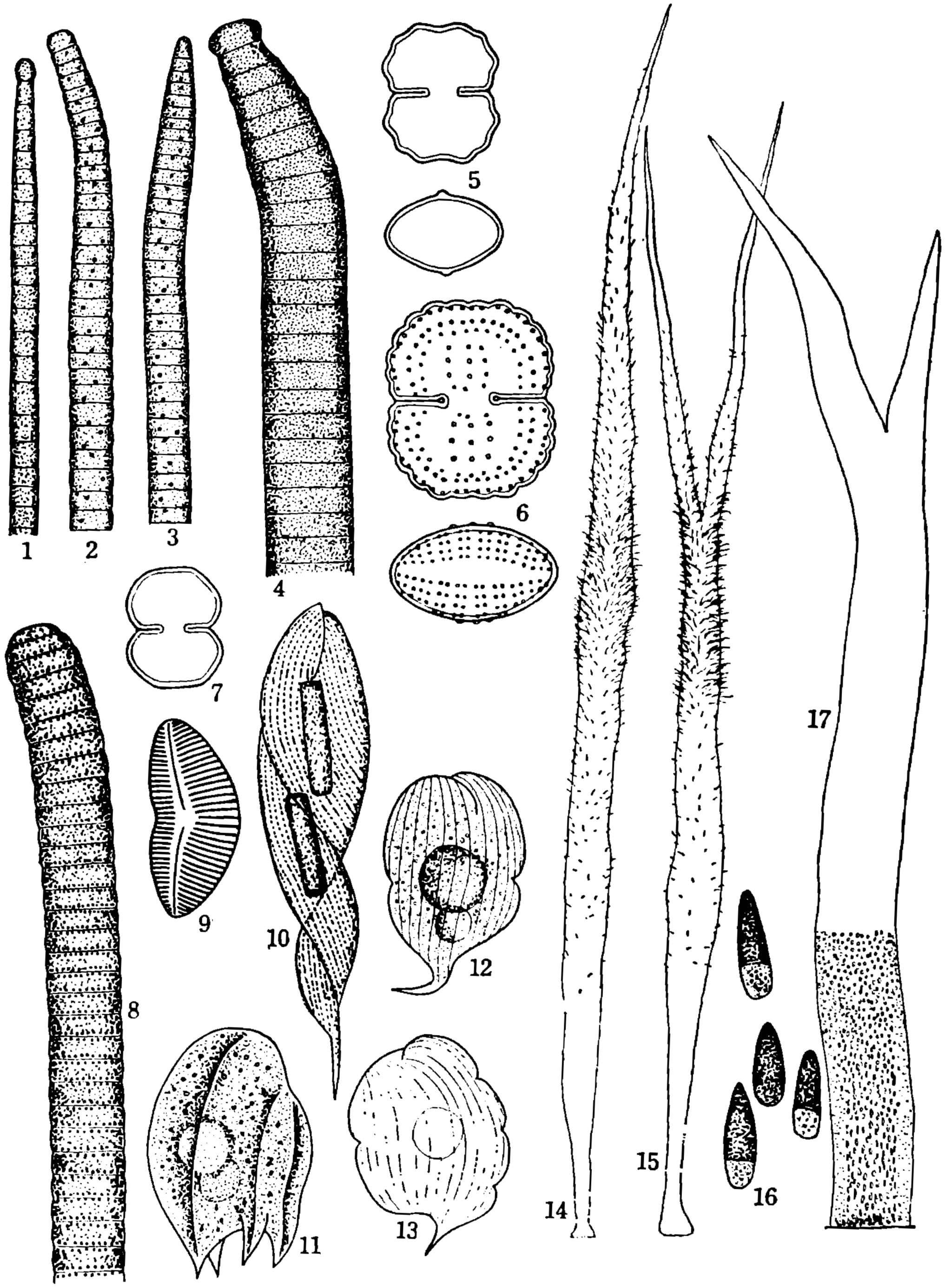
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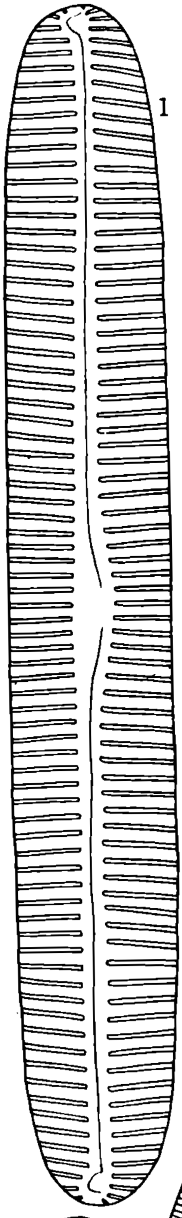
Plate 2.

1. Pinnularia viridis (Nitzsch) Ehrenb. var. intermedia Cleve
2. Pinnularia microstauron (Ehrenb.) Cleve var. longirostris Font.
3. Navicula radiosa Kütz. var. cuneata A. Cleve
4. Stauroneis anceps Ehrenb. var. subcapitata Oestr.
5. Stauroneis kriegeri Patrick
6. Neidium productum (W. Sm.) Cleve var. minor A. Cleve
7. Navicula wittrockii (Lagerst.) A. Cleve
8. Caloneis bacillaris (Gregory) Cleve
9. Cymbella kolbei Hustedt
10. Navicula rotaeana (Rabenh.) Grun.
11. Navicula dicephala (Ehrenb.) W. Sm.
12. Pinnularia brebissonii (Kütz.) Cleve var. hybrida (Grun.) A. Cleve
13. Navicula pupula Kütz. var. minuta V. H.
14. Pinnularia hyperborea Cleve var. tibetica (Meresch.) A. Cleve
15. Navicula menisculus Schum.
16. Navicula rhyncocephala Kütz. var. amphiceros (Kütz.) V. H.
17. Navicula halophila (Grun.) Cleve var. okamurae Skvortzow
18. Navicula cuspidata Kütz. var. ambigua (Ehrenb.) Cleve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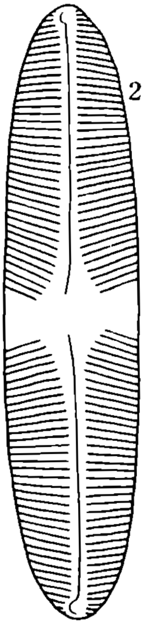
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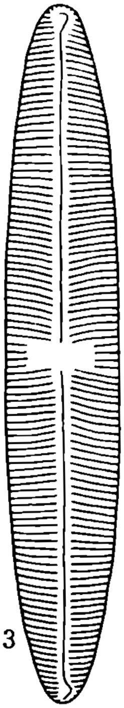
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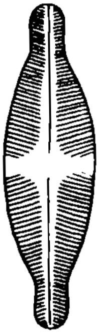
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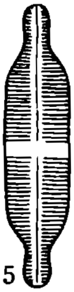
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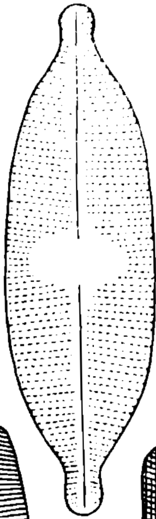
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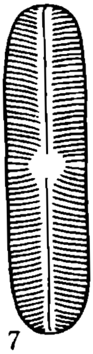
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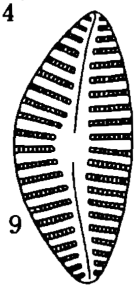
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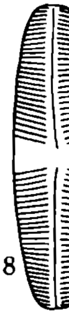
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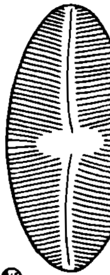
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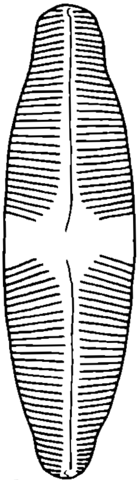
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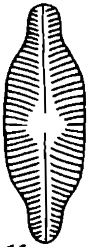
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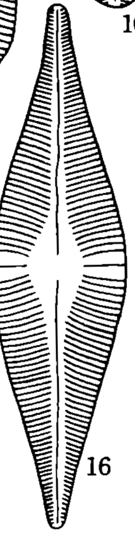
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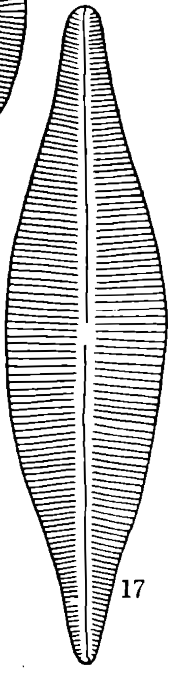
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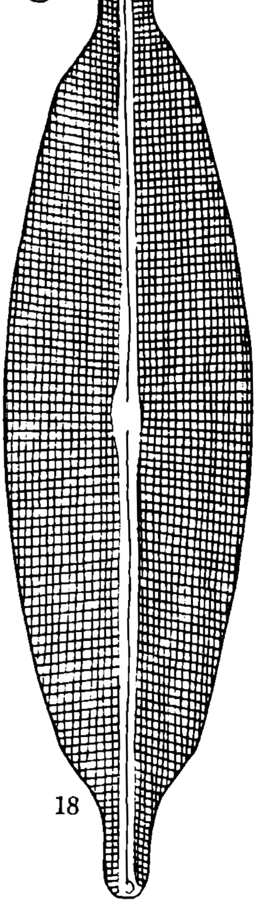
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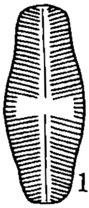
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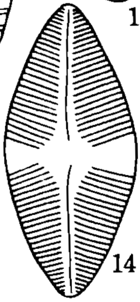
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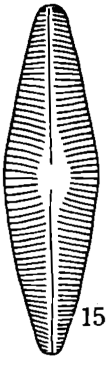
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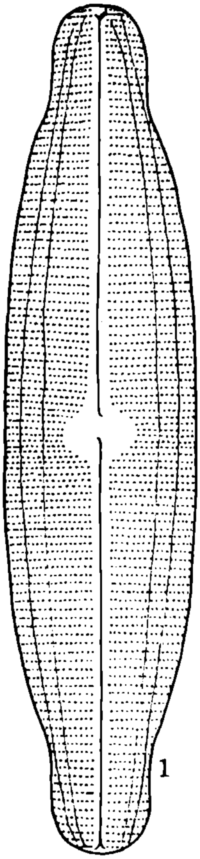
Plate 3.

1. Neidium iridis (Ehrenb.) Cleve var. ampliata (Ehrenb.) Cleve
2. Cymbella naviculiformis Auersw.
3. Cymbella hungarica (Grun.) Pant. var. grunowii A. Cleve
4. Cymbella alpina Grun.
5. Cymbella aequalis W. Sm. var. subaequalis (Grun.) Mayer
6. Amphora coffaeiformis Ag. var. borealis (Kütz.) Cleve
7. Navicula gregaria Donk.
8. Nitzschia sinuata (W. Sm.) Grun. var. tabellaria Grun.
9. Nitzschia palea (Kütz.) W. Sm. forma tenuirostris Grun.
10. Gomphonema angustatum (Kütz.) Rab. var. sarcophagus (Gregory) V. H.
11. Gomphonema intricatum Kütz.
12. Gomphonema intricatum var. dichotoma (Kütz.) Grun.
13. Gomphonema intricatum var. pumila Mayer
14. Nitzschia frustulum (Kütz.) Grun. var. perminuta Grun.
15 Gomphonema abbreviatum Ag.
16. Gomphonema gracile Ehrenb. var. auritum (A. Br.) Cleve
17. Cymbella cistula (Hempr.) Grun. var. crassa (Grun.) A. Cleve
18. Cymbella helvetica Kütz.
19. Eunotia tschirchiana O. Müll.
20. Eunotia veneris (Kütz.) O. Müll.
21. Amphora veneta Kütz.
22. Amphora ostenfeldi Hustedt
23. Nitzschia triblionella Hantzsch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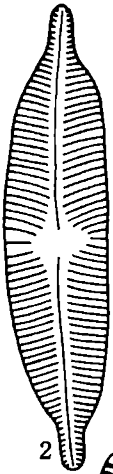
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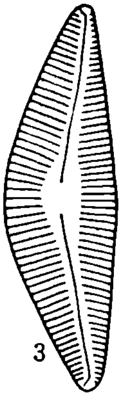
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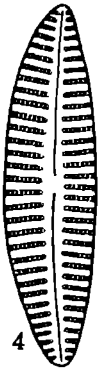
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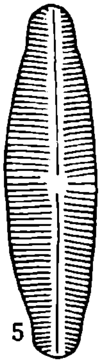
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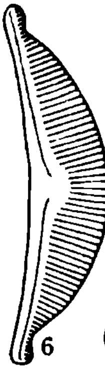
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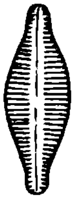
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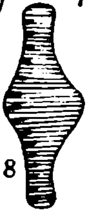
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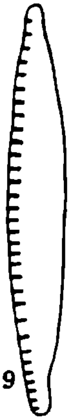
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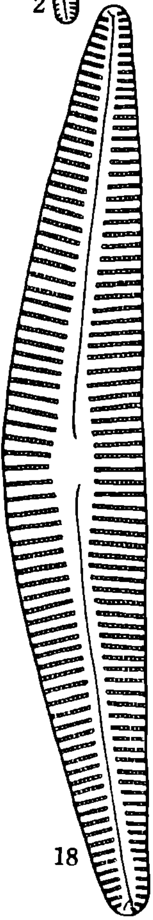
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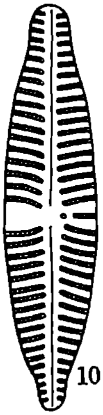
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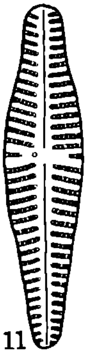
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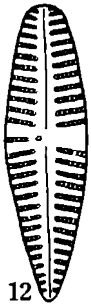
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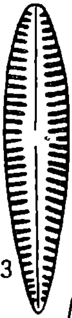
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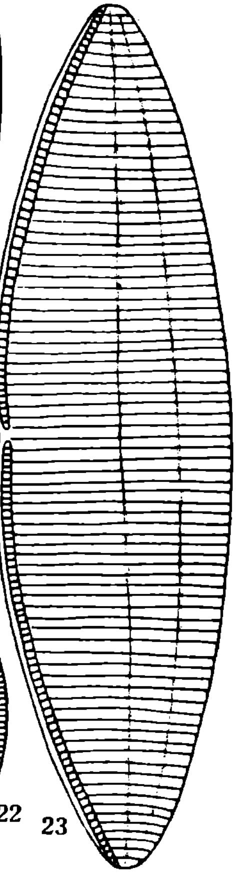
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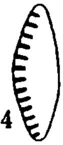
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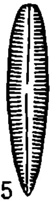
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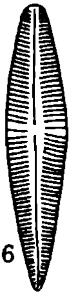
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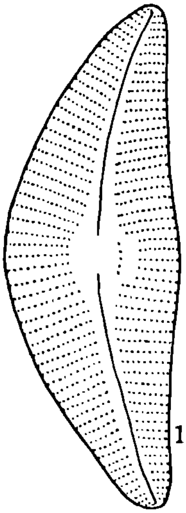
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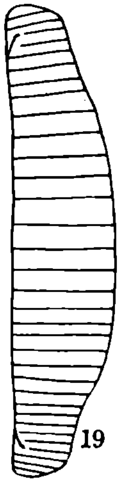
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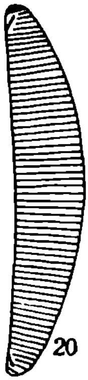
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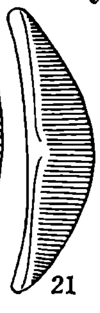
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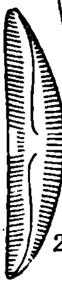
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Plate 4.

1. Cymbella ehrenbergii Kütz.
2. Ceratoneis arcus Kütz. var. amphioxys (Rabenh.) Brun.
3. Surirella terryana Ward
4. Nitzschia spectabilis (Ehrenb.) Ralfs
5. Nitzschia suecica (Grun.) A. Cleve
6. Nitzschia sigmoidea (Ehrenb.) W. Sm.
7. Nitzschia communis Rabenh. var. abbreviata Grun.
8. Navicula parva (Menegh.) A. Cleve
9. Nitzschia palea (Kütz.) W. Sm. forma minuta (Bleisch) A. Cleve
10. Ceratoneis arcus Kütz. var. amphioxys (Rabenh.) Brun.
11. Surirella decipiense A. Cleve
12. Hantzshia amphioxys (Ehrenb.) Grun. var. rupestris Grun.
13. Surirella tenuissima Hustedt

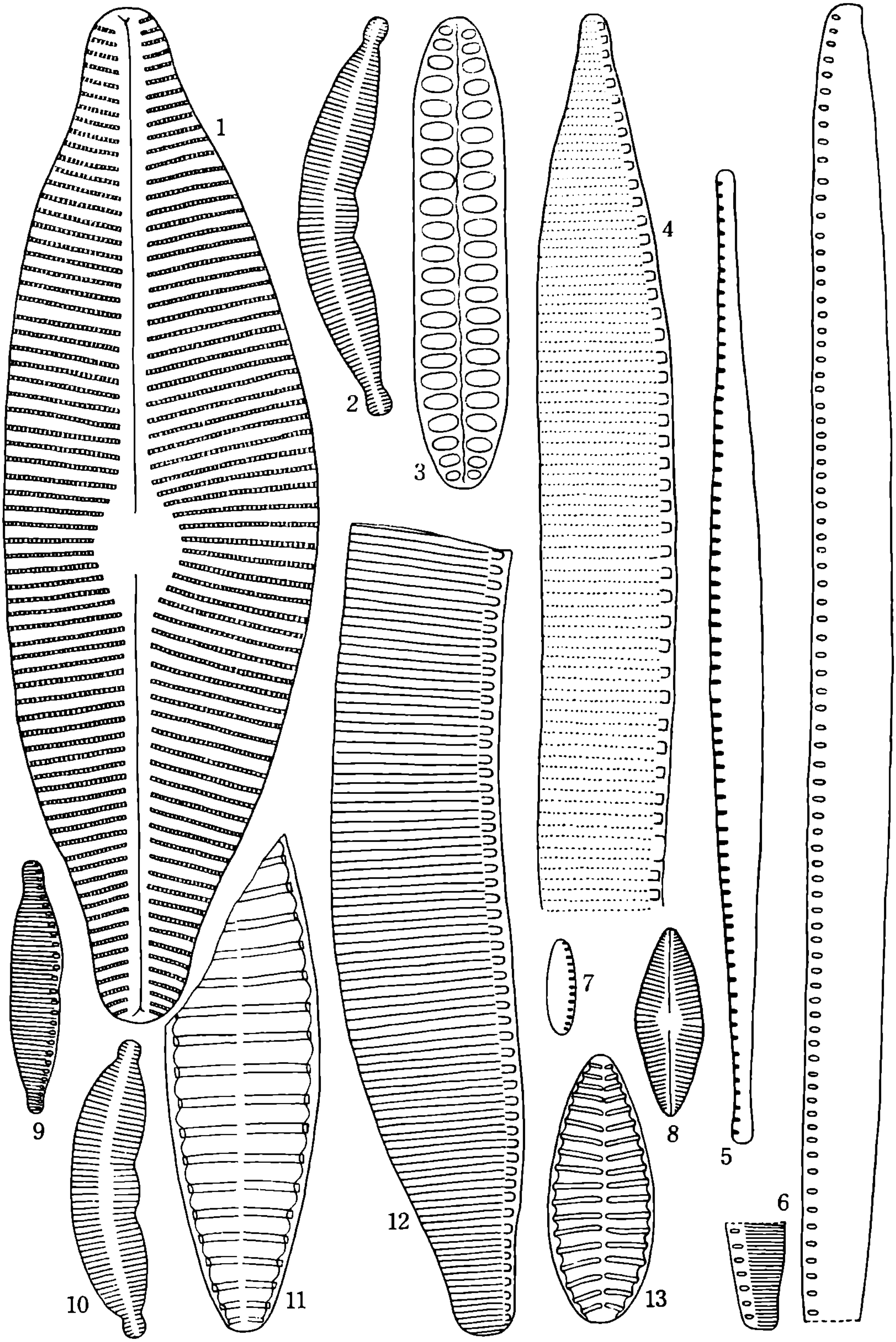
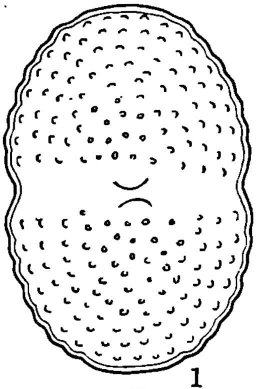


Plate 5.

1. Staurastrum yosiianum Hirano, sp. nov.
2. Cosmarium crenatum Ralfs var. boldtianum (Gutw.) W. & G. S. West
3. Cosmarium sakatoanum Hirano, sp. nov.
4. Cosmarium noshaquense Hirano, sp. nov.
5. Cosmarium curtum (Bréb.) Ralfs
6. Cosmarium formosulum Hoff.
7. Cosmarium biretum Bréb.
8. Cosmarium magnificum Nordst.
9. Cosmarium botrytis (Bory) Menegh. var. mesoleium Nordst.



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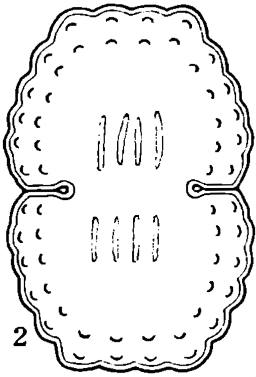

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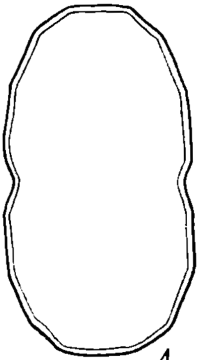

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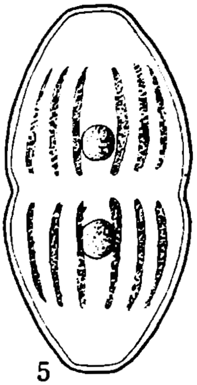

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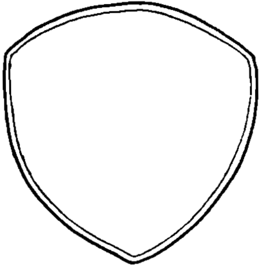

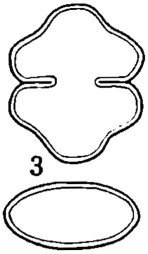

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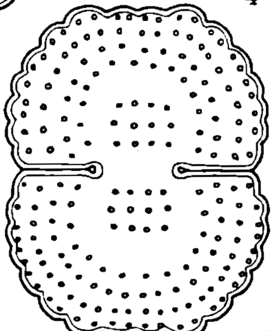

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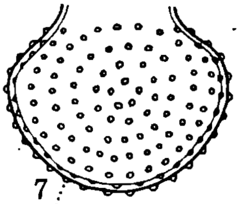

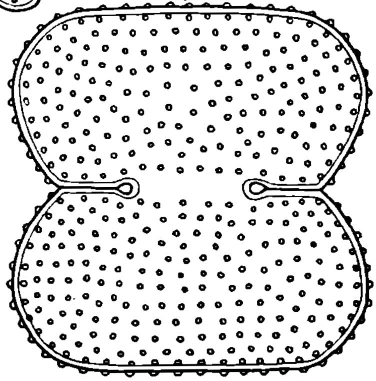

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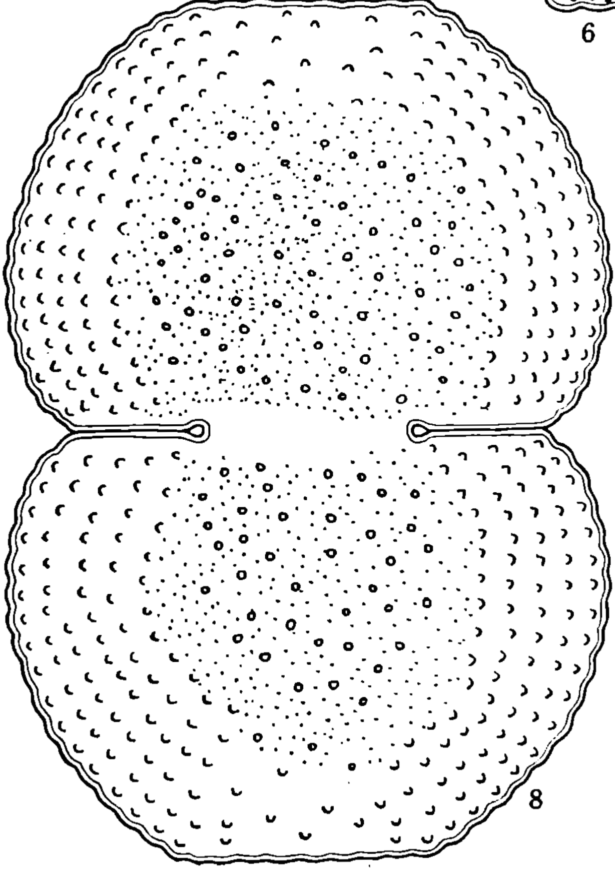

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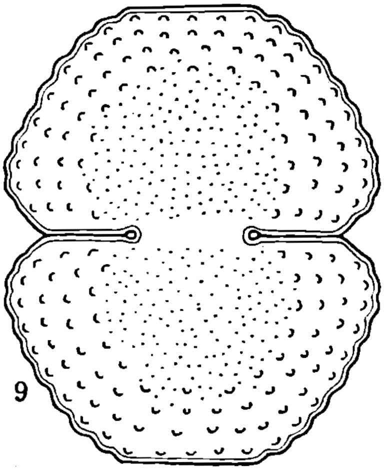

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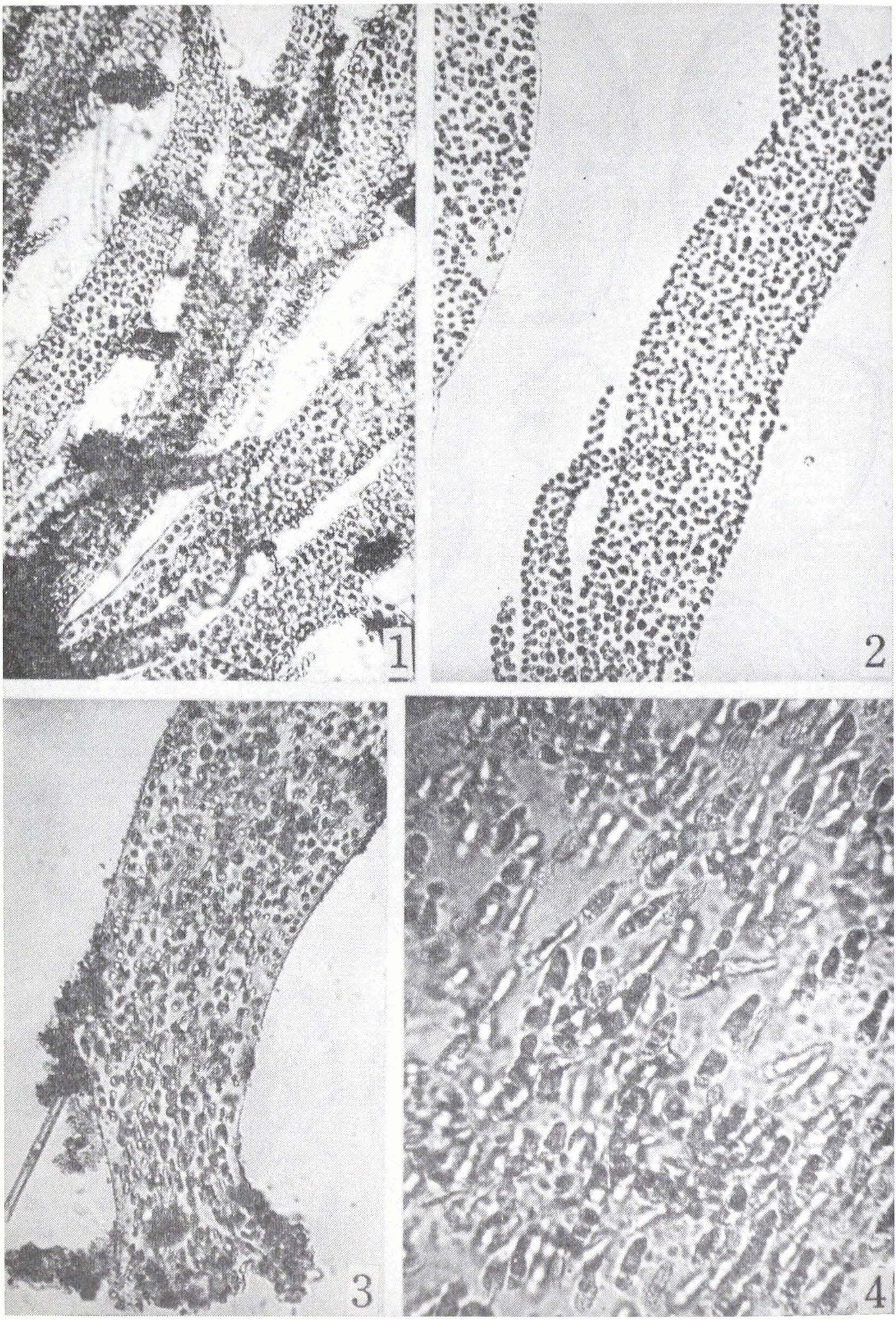


Nanurus flaccidus Skuja 1. Outline of thallus 2. Branching of thallus 3. Basal part of thallus 4. Cells in the basal part of thallus

Freshwater Algae of Karakoram and Swat-Himalaya

By

Minoru HIRANO

I. Small collections of algae from Karakoram

Kyoto University Scientific Expeditions to Karakoram and Hindukush were carried out in 1955. The Karakoram branch party started its exploration from Karachi on May 22, 1955 and returned to Karachi on August 29, 1955. During this period Dr. S. Nakao (Professor of Osaka Prefectural University at present), a member of the party, collected some algae samples at the following four places : Three vials from small ponds of the alpine meadow along the Hispar glacier and one from the oasis at Khanabad. The writer has found 11 species of algae in two vials obtained from the alpine zone along the Hispar glacier and six species among these algae were desmid. This fact suggests that desmids are the dominant element in the alpine algae flora.

	Date of sampling	Time	Altitude	Water temperature	Water colour	Note
Moraine pond	18/VI, 1955	7.30	3200m	12°C	Muddy green	Margin surrounded by Rumex species
Small pond behind moraine	18/VI, 1955	13.30	4000m	19°C	Muddy light green	Probably temporary
Oasis of Khanabad	7/VI, 1955	8.30	1900m	22°C	—	Growing rich in Potamogeton species
Glacier lake	22/VI, 1955	13.00	4500m	8°C	Muddy light green	Sample lost

CYANOPHYTA

Oscillatoriaceae

Oscillatoria brevis (Kütz.) Gomont in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 173, 1964. Fig. 1.

Hab. Moraine pond along Hispar glacier.

Oscillatoria splendida Grev. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 174, 1964.

Hab. Moraine pond along Hispar glacier.

Nostocaceae

Anabaena sp.

Trichomes slender, about 3μ in diameter, heterocyst elliptic, 3.5μ in diameter and 4μ long. Resting spore absent.

Hab. Moraine pond along Hispar glacier.

EUGLENOPHYTA

Euglenaceae

Phacus pleuronectes (O. F. M.) Duj. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 179, 1964.

Hab. Oasis of Khanabad.

CHRYSOPHYTA

Diatomeae

Eunotiaceae

Eunotia valida Hustedt in Krypt. Fl. 7 : 2, p. 288, f. 754, 1932.

Valves 68–73μ long, 4.4–5μ broad.

Hab. Oasis of Khanabad. Distr. Europe.

Achnanthaceae

Achnanthes coarctata Bréb. var. **elliptica** Krasske in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 187, pl. 2, f. 22, 23, 1964.

Valves 44–48μ long, 13–14μ broad, and striae 7–9 in 10μ.

Hab. Oasis of Khanabad.

Cymbellaceae

Gomphonema lanceolatum Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 2, 1964.

Hab. Oasis of Khanabad.

Nitzschiaceae

Hantzschia amphioxys (Ehrenb.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 206, pl. 10, f. 17, 1964.

Hab. Small pond along Hispar glacier.

CHLOROPHYTA

Euchlorophyceae

Chlorellaceae

Tetraedron minimum (A. Br.) Hansg. in Brunthaler, Süssw.-fl. 5, p. 147, f. 155, 1915 ; Smith, Wisc. Bull. 57, p. 118, pl. 24, f. 10–13, 1920.

Hab. Oasis of Khanabad. Distr. Cosmopolitan.

Hydrodictyaceae

Pediastrum boryanum (Turp.) Menegh. in Brunthaler, Süssw.-fl. 5, p. 100, f. 61a, 1915 ; Smith, Wisc. Bull. 57, p. 169, pl. 46, f. 2-7, 1920.

Hab. Oasis of Khanabad. Distr. Cosmopolitan.

Scenedesmaceae

Scenedesmus bijugatus (Turpin) Kütz. in W. & G. S. West, Trans. Linn. Soc. Bot. ser. II, 5, p. 82, pl. 9, f. 38, 1895 ; Printz, Det. Kgl. Norsk. Vid. Selsk. Skr. p. 34, pl. 4, f. 204, 205, 1916.

Hab. Oasis of Khanabad. Distr. Cosmopolitan.

var. **alternans** (Reinsch) Hansg. in Brunthaler, Süssw.-fl. 5, p. 167, f. 234, 1915 ; Grönblad, Mem. Soc. Faun. Flor. Fenn. 10, p. 270, textf. 4, f. 49-52, textf. 5, f. H, 1934.

Hab. Oasis of Khanabad. Distr. Japan, Manchuria, Siberia, Europe, N. America, Brazil, New Caledonia, and Africa.

Coelastrum sphaericum Näg. in Gatt. einz. Alg. p. 97, pl. V. C, f. 1, 1849 ; Brunthaler, Süssw.-fl. 5, p. 196, f. 308, 1915.

Hab. Oasis of Khanabad. Distr. Cosmopolitan.

Conjugatae

Desmidiaceae

Closterium parvulum Näg. in Hirano, Contr. Biol. Lab. Kyoto Univ. 1, p. 43, pl. 4. f. 13, 1955.

Cells 85-114μ long and 12-13μ broad.

Hab. Moraine pond along Hispar glacier. Distr. Cosmopolitan.

Closterium strigosum Bréb. in Hirano, Contr. Biol. Lab. Kyoto Univ. 1, p. 37, pl. 4, f. 9, 1955.

Cells 162-170μ long and 12.5-13μ broad.

Hab. Moraine pond along Hispar glacier. Distr. Pamir, Siberia, Europe, Sumatra, Japan, N. America, Brazil, Australia, and Africa.

Cosmarium biretum Bréb. in W. & G. S. West, Monogr. Brit. Desm. 4, p. 25, pl. 101, f. 1-8, 1911.

Cells 66-73μ long, 66-68μ broad, and isthmus 22-26μ broad. The specimens coincide with the figure 1 and 4 given by W. & G. S. West. The apex is not straight and horizontal but convex-elevated and flattened in the middle. The disposition of granules on the face of semicell is not vertical but is in oblique-decussating series except in the middle which is disposed somewhat irregularly. Fig. 9.

Hab. Moraine pond along Hispar glacier. Distr. Europe.

Cosmarium cucurbita Bréb. forma **latior** West in Hirano, Contr. Biol. Lab. Kyoto Univ. 2, p. 81, pl. 16, f. 7, 1956.

Cells 54-57μ long, 28.5-30.8μ broad, and isthmus 27-28.6μ broad. Fig. 2.

Hab. Small pond along Hispar glacier. Distr. British Isles and Japan.

Cosmarium granatum Bréb. var. **subgranatum** Nordst. in Hirano, Contr. Biol. Lab. Kyoto Univ. 4, p. 130, pl. 20, f. 24, 1957.

Cells 31-33μ long, 24-25.5μ broad, and isthmus 8-8.8μ broad.

Hab. Oasis of Khanabad. Distr. Japan, Manchuria, S. China, Europe, N. & S. America, and New Zealand.

Cosmarium scopulorum Borge in Ark. Bot. 18 : 10, p. 12, pl. 1, f. 14, 1923 ; Nygaard, Trans. Roy. Soc. S. Afr. 20, p. 140, f. 40a, 1932 ; Messikommer, Nov. Hedw. 4, p. 161, pl. 51, f. 3, 1962.

Cells 23-24μ long, 17-17.6μ broad, and isthmus 4-4.4μ broad. This species was first described from Sweden. The present specimens are slightly larger than that of Swedish form but rather coincide with the form reported by Messikommer from middle Europe as a form of the present species. The lower lateral margin is always divergent and never become vertical, and upper lateral margin is strongly convergent. The apex is narrow and almost flattened or slightly convex and never retuse. Lateral and apical angles are somewhat variable, obtuse or rounded. The upper lateral margin is always longer than the lower one therefore the outline of the semicell was a reniform appearance. This species resembles C. angulosum but may be distinguished from that species by the relatively shorter length of upper compared to the lower lateral margin, and by the difference of direction of lower lateral margin, vertical in C. angulosum but divergent in C. scopulorum. The specimens from the oasis of Khanabad are somewhat different from those of the pond of Hispar glacier. The semicells are depressed and their apices are variable, straight but sometimes retuse. C. laeve var. pseudorectangularis reported by Fritsch & Rich from S. Africa resembles very closely the present specimens obtained from Khanabad. Therefore the writer considers the African forms to be belong to the present species. However the apices of the African forms are narrower than those of the present form and the retuseness of the apices is more distinct. Figs. 5, 6.

Hab. Moraine pond along Hispar glacier. Distr. Europe and S. Africa.

Cosmarium subcostatum Nordst. forma **minor** W. & G. S. West in Monogr. Brit. Desm. III, p. 238, pl. 87, f. 6-9, 1908.

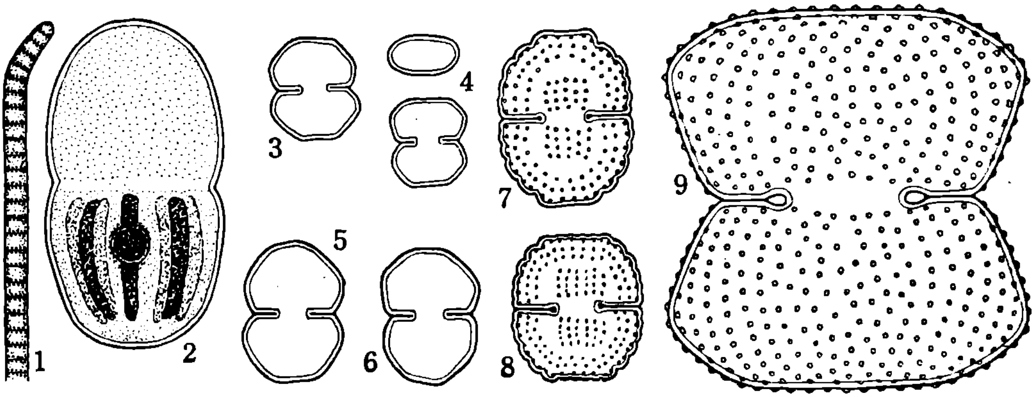
Cells 28-29μ long, 23.5-23.8μ broad, and isthmus 7.5-8μ broad. The present specimens are slightly larger than those of the English form. The lateral margin is 3-crenulated ; the two upper crenulations are prominent and the lowermost one is small and reduced. Figs. 7, 8.

Hab. Moraine pond of the Hispar glacier. Distr. Ceylon, Europe, Greenland, and arctic Canada.

Cosmarium succisum West var. **hians** Lütkem. in Verh. Zool. Bot. Ges. Wien p. 494, pl. 2, f. 31–33, 1910 ; Borge, Ark. Bot. 29A, p. 19, f. 10, 1939.

Cells 17–18μ long, 15.4–16μ broad, and isthmus 4–4.3μ broad. The present specimens are somewhat larger than those described by Lütkemüller but coincide with the outline. The Swedish forms of this species are the same size as the original form. The present forms resemble C. abbreviatum forma pygmaea and forma minor given by E. Messikommer from Switzerland, but his forms have both a broader apex and a deeper sinus than Lütkemüller's form. Figs. 3, 4.

Hab. Oasis of Khanabad. Distr. Sweden and Switzerland.



Explanation of figures

1. Oscillatoria brevis Kütz. 2. Cosmarium cucurbita Bréb. forma latior West 3, 4. C. succisum West var. hians Lütkem. 5, 6. C. scopulorum Borge 7, 8. C. subcostatum Nordst. forma minor W. & G. S. West 9. C. biretum Bréb.

II. The Algae from Swat-Himalaya

The Explorer's Club of Kyoto University has made a expedition to the Swat-Himalaya in 1957, and at that time Mr. K. Honda has made a collection of algae at the writer's request. The Swat-Himalaya is located on the westermost part of the Great Himalayan Range and the district is said to be fairly rich in precipitation. Therefore, it is interesting to compare its flora with that of the northeastern part of Afghanistan which has a similar climatic condition. At present no information is available concerning the algae of these districts. The collecting places where the present report is concerned are shown in the table.

Table of collecting places

Vial number	Date of sampling	Time	Collecting places	Water temperature	Altitude (m.)	Notes
8, 9	9/VIII, '57	12.00	Naz bar	9.0°C	2550	
12	9/VIII, '57	17.00	A point 3 km. distance west from Dalti	7.5°C	3100	Northern tributary of the valley
14	9/VIII, '57	18.00	A point 5 km. distance west from Dalti	8.0°C	3150	Same as above
15	10/VIII, '57	10.00	Multan Bulanz Bar	4.0°C	3400	Northern tributary of the valley
18	10/VIII, '57	12.00	A point 2 km. distance east from Yaltar Bar	5.5°C	3500	Northern tributary of the valley
20	10/VIII, '57	17.00	Mash Bar	6.5°C	3900	
22	11/VIII, '57	9.00	Upper reaches of Naz Bar	4.0°C	4400	
23	11/VIII, '57	11.00	Same as above	2.5°C	4600	
25	11/VIII, '57	12.00	Same as above	1.0°C	4700	Lowermost edge of the glacier
26	27/VIII, '57	11.00	Between Buni and Diryanu	17.5°C	1900	
27	28/VIII, '57	11.00	Pahan Lasht	14.0°C	1800	

CYANOPHYTA

Oscillatoriaceae

Oscillatoria brevis (Kütz.) Gomont in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 173, 1964.

Trichomes not constricted at the cross wall, 5.3-6.6μ in diameter. Fig. 1.

Hab. Nos. 12, 22, and 27.

Nostocaceae

Nostoc sphaericum Vauch. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 177, 1964.

Colonies spherical and gelatinous matrix yellowish ; trichome well flexuose, 4.4μ in diameter ; heterocyst elliptic, 5.3μ in diameter, 6.9-7.8μ long ; resting spore absent. The present specimens resemble this species but it is impossible to decide the accurate name for the present specimens by above mentioned characters.

Hab. No. 9.

CHRYSOPHYTA

Hydruraceae

Hydrurus foetidus (Vill.) Kirchn. in Pascher, Süssw.-fl. 2, p. 87, f. 139, 1913 ; Smith, Freshw. Alg. U. S. p. 437, f. 353, 1950.

Hab. Nos. 14, 15, 18.

Diatomeae

Fragilariaceae

Diatoma hiemale (Lyngb.) Heib. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, 1964.

Valves 30.8-39.6μ long, and 8-11μ broad.

Hab. Nos. 9, 12, 18, 22.

var. **mesodon** (Ehrenb.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 181, pl. 2, f. 6, 1964.

Valves 17.6-19.2μ long and 8-8.8μ broad.

Hab. Nos. 12, 26.

Ceratoneis arcus Kütz. var. **amphioxys** (Rabenh.) Brun. in Hustedt, Süssw.-fl. 10, p. 135, f. 123, 1930 ; A. Cleve, Diat. Schw. Finn. 2, p. 54, f. 373, f, g, 1953.

Valves 44-53μ long and 6.6-7μ broad.

Hab. Nos. 2, 3, 8, 14, 18. Distr. Afghanistan and Europe.

Synedra ulna (Nitzsch) Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped, Karak. Hind. III, p. 184, 1964.

Hab. No. 26.

Achnanthaceae

Cocconeis placentula Ehrenb. var. **lineata** (Ehrenb.) Cleve in Hustedt, Süssw.-fl. 10, p. 190, f. 262, 1930.

Hab. Nos. 8, 18, 20, 26. Distr. Cosmopolitan.

Achnanthes delicatula (Kütz.) Grun. in Hustedt, Krypt. Fl. 7 : 2, p. 389, f. 836. 1933 ; A. Cleve, Diat. Schw. Finn. 3, p. 45, f. 583a-d, 1953.

Valves 15-17μ long, 6-6.5μ broad, and striae 14-15 in 10μ.

Hab. No. 26. Distr. Europe.

Naviculaceae

Stauroneis anceps Ehrenb. in Hustedt, Krypt. Fl. 7 : 2, p. 771, f. 1120a, 1959.

Valves 51-60μ long and 12-13μ broad.

Hab. No. 22. Distr. Burma, Hunan, Szechwan, and Europe.

Frustulia rhomboides (Ehrenb.) De Toni in Hustedt, Krypt. Fl. 7 : 2, p. 728, f. 1098a, 1937 ; A. Cleve, Diat. Schw. Finn. 5, p. 7, f. 1326a, 1955.

Hab. No. 23. Distr. Cosmopolitan.

Gyrosigma spenceri (W. Sm.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak, Hind. III, p. 189, pl. 4, f. 12, 1964.

Valves 97-154μ long, 13.6-19μ broad, and striae 18-20 in 10μ.

Hab. No. 26.

Navicula anglica Ralfs in Hustedt, Süssw.-fl. 10, p. 303, f. 530, 1930 ; A. Cleve, Diat. Schw. Finn. 3, p. 141, f. 790a-d, 1953.

Valves 41-43μ long, 13-14μ broad, and striae 9-10 in 10μ. Fig. 8.

Hab. No. 22. Distr. Tibet, Europe.

Navicula cryptocephala Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 191, pl. 5, f. 12, 1964.

Valves 12.8-24.7μ long, 3.2-6μ broad, and striae 12-18 in 10μ.

Hab. Nos. 23, 26, 27.

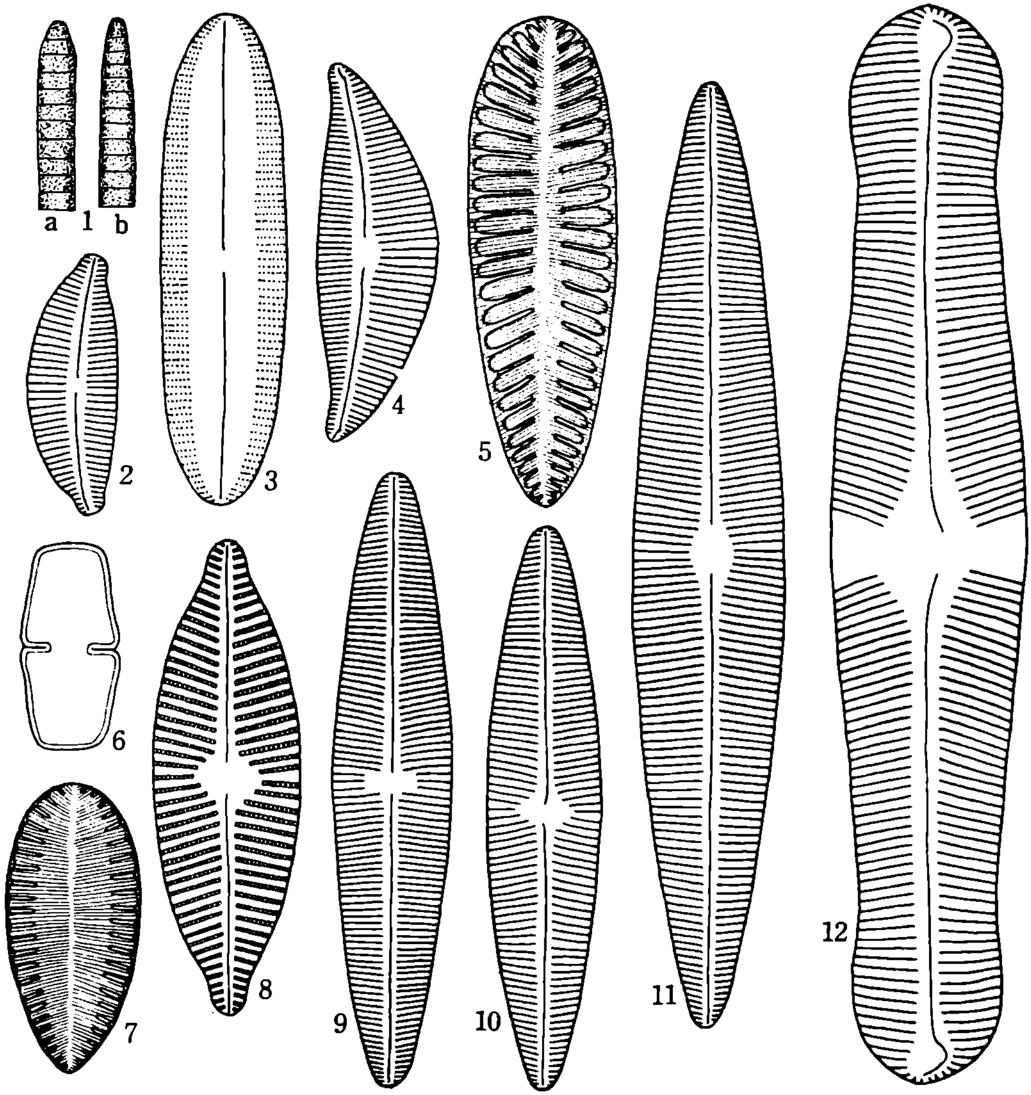
Navicula debilis Pant. in Foss. Bacill. Ung. II, p. 44, 1886 ; *Pinnularia debilis* (Pant.) A. Cleve, Diat. Schw. Finn. 4, p. 35, f. 1041a-c, 1955.

Valves sublinear or linear-elliptic, 42-43μ long, and 11.8-12.3μ broad, with well rounded ends, axial area narrow lanceolate, striae short, punctated, parallel in the middle, 10-12 in 10μ, slightly radial near the ends. Fig. 3.

Hab. No. 26. Distr. Europe.

Navicula peregrina (Ehrenb.) Kütz. in Hustedt. Süssw.-fl. 10, p. 300, f. 516, 1930.

Valves lanceolate with rounded ends, 70-72μ long, 11-11.4μ broad, axial area narrow-linear, expanded in the middle, central area elliptic, striae radial but convergent near the ends. The specimens resemble Navicula radiosa and N. globulifera var. nipponica but differ from the former species in having a transversely



Explanation of figures.

1. Oscillatoria brevis Kütz. 2. Cymbella amphicephala Näg. 3. Navicula debilis Pant. 4. Cymbella caespitosa (Kütz.) Brun. var. valida (Pant.) A. Cleve 5. Surirella ovata Kütz. var. pinnata (W. Sm.) Hustedt 6. Cosmarium incertum Schmidle 7. Surirella ovata Kütz. 8. Navicula anglica Ralfs 9, 10. Navicula peregrina (Ehrenb.) Kütz. var. kefvingensis (Ehrenb.) Cleve 11. Navicula peregrina (Ehrenb.) Kütz. 12. Pinnularia mesogongyla Ehrenb. var. interrupta Cleve

elliptic form of the central area and differ from the latter by slightly broader valve. Fig. 11.

Hab. No. 9. Distr. Hunan and Europe.

var. **kefvingensis** (Ehrenb.) Cleve in Hustedt, Süssw.-fl. 10, p. 300, 1930; A. Cleve, Diat. Schw. Finn. 3, p. 149, f. 803b, 1953.

Valves 44-54μ long, 9.7-10μ broad, and striae 9-12 in 10μ. Figs. 9, 10.

Hab. No. 26. Distr. Europe.

Pinnularia brebissonii (Kütz.) Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 194, pl. 7, f. 6, 7, 1964.

Valves 49-52μ long, 13-13.6μ broad, and striae 12 in 10μ.

Hab. No. 22.

Pinnularia mesogongyla Ehrenb. var. **interrupta** Cleve in A. Cleve, Diat. Schw. Finn. 4, p. 44, f. 1057c, 1955.

Valves 79-82μ long, 17.6-18μ broad, and striae ca. 8 in 10μ. Fig. 12.

Hab. No. 18. Distr. N. Europe.

Cymbellaceae

Amphora lybica Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 196, 1964.

Valves 24-30μ long, 7-8μ broad, and striae ca. 18 in 10μ.

Hab. No. 26.

Cymbella affinis Kütz. var. **excisa** (Kütz.) Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 197, 1964.

Valves 40-44μ long, and 12-13μ broad.

Hab. No. 26.

Cymbella amphicephala Näg. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 197, pl. 8, f. 11, 1964.

Valves 22-26μ long, 7.7-8.5μ broad, and striae in ventral side 12-14, in dorsal 18-20 in 10μ. Fig. 2.

Hab. No. 26.

Cymbella caespitosa (Kütz.) Brun. var. **auerswaldii** (Rabenh.) A. Cleve in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 198, pl. 9, f. 9, 1964.

Valves 25.5-26.5μ long, and 8.8-9.3μ broad.

Hab. No. 12.

var. **valida** (Pant.) A. Cleve in Diat. Schw. Finn. 4, p. 126, f. 1178d-e, 1955.

Valves 32-35μ long, and 9μ broad. Fig. 4.

Hab. No. 18. Distr. Europe.

Cymbella stuxbergii (Cleve) Wislouch in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 201, pl. 9, f. 11, 12, 1964.

Valves 84-88μ long, and 22μ broad.

Hab. Nos. 8, 12.

Cymbella ventricosa Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 201, pl. 9, f. 2, 7, 1964.

Valves 12-21μ long, 3.5-6μ broad, and striae 9-12 in 10μ.

Hab. Nos. 22, 26, 27.

var. **minuta** (Hilse) V. H. in A. Cleve, Diat. Schw. Finn. 4, p. 125, f. 1177g-i, 1955.

Valves 17-18μ long, 5-5.5μ broad, and striae ca. 18 in 10μ.

Hab. No. 22.

Didymosphenia geminata (Lyngb.) M. Schmidt in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 202, pl. 4, f. 13-15, 1964.

Valves 128-140μ long, and 42-44μ broad.

Hab. No. 8.

Gomphonema angustatum (Kütz.) Rabenh. var. **sarcophagus** (Greg.) V. H. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 20, 1964.

Valves 21-24μ long, 6.5-7μ broad, and striae ca. 12 in 10μ.

Hab. No. 26.

Gomphonema lanceolatum Ehrenb. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 203, pl. 10, f. 2, 1964.

Valves 43-66μ long, 8.5-20μ broad, and striae 9-11 in 10μ. Valves heteropolar, apical poles broadly rounded, and foot poles narrow and rounded, superial side straight, inferior side slightly concave, axial area narrowly linear with slightly expanded central area, striae radial, punctated, central stria slightly separate from both adjacent striae and having a stigma.

Hab. No. 26.

Gomphonema parvulum (Kütz.) V. H. in A. Cleve, Diat. Schw. Finn. 4, p. 177, f. 1269a-c, 1955.

Valves 23-27μ long, 7.7-8.5μ broad, and striae ca. 12 in 10μ.

Hab. Nos. 18, 22.

Nitzschiaceae

Hantzschia amphioxys (Ehrenb.) Grun. var. **capitata** O. Müll. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 206, pl. 10, f. 17, 1964.

Valves 34-37μ long, 6.8-7.5μ broad, and striae 24-30 in 10μ.

Hab. Nos. 8, 22, 26.

Nitzschia amphibia Grun. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 206, pl. 3, f. 13, 1964.

Valves 27-28μ long, and 4.8-5μ broad.

Hab. No. 26.

Nitzschia palea (Kütz.) W. Sm. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 207, pl. 11, f. 13, 1964.

Valves 34-46μ long, and 3.7μ broad.

Hab. No. 22.

Nitzschia regula Hustedt in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 208, pl. 11, f. 3, 1964.

Valves 95-102μ long, and 5μ broad.

Hab. No. 26.

Surirellaceae

Surirella ovata Kütz. in Hirano, Res. Kyoto Univ. Sci. Exped. Karak. Hind. III, p. 209, pl. 11, f. 16, 1964. Fig. 7.

Hab. No. 26.

var. **pinnata** (W. Sm.) Hustedt in Süssw.-fl. 10, p. 442, f. 865, 1930.

Valves 39-40μ long, and 12-13μ broad. Fig. 5.

Hab. No. 26.

Surirella spiralis Kütz. in Hustedt, Süssw.-fl. 10, p. 445, f. 870, 1930 ; Hirano, Faun. Flor. Nep. Himalaya 1, p. 42, pl. 7, f. 25, 1955.

Hab. No. 26.

CHLOROPHYTA

Desmidiaceae

Cosmarium incertum Schmidle in Borge, Ark. Bot. 23A, p. 39, pl. 2, f. 32, 1930.

Cells 30-33μ long, 15-15.4μ broad, and isthmus 8-8.5μ broad. The present specimens fairly well coincide with the Swedish form reported by Borge, but the cells are somewhat narrower than his form. This species similar to Cosmarium granatum but differs form it in having a broader apex. Borge reported a similar form from Brazil under the name Cosmarium exiguum. The present specimens coincide with his form by in semicell outline but are slightly larger than his dimensions. Fig. 6.

Hab. No. 9.

Acknowledgements. The writer acknowledge with much pleasure and gratitude the contributions of Prof. Dr. Sasuke Nakao and Mr. Katsuichi Honda in bringing back valuable collections these districts.

Additions and Corrections to Flora of Afghanistan

By

Siro KITAMURA

The present author's Flora of Afghanistan was published in June, 1960.

Since that time, many species including those new to Science, were newly reported from Afghanistan, by N. L. Bor, A. Gilli, T. Hashimoto, A. Patzak, K. Rechinger, H. Riedel, P. Wendelbo and others.

Recently, several missions for botanical collections were sent to Afghanistan ; K. Lindberg in Aug. 1960, K. Rechinger from May to September 1962, P. Wendelbo and Ian Hedge from April to July 1962. Mr. T. Hashimoto, Koishikawa Botanical Gardens of Tokyo University, stayed one year from Oct. 1961, as a floriculturalist in Kabul. He collected plants in his leisure hours.

Dr. Riozo Yosii, Prof. of Biology (zoologist) of Kyoto University, as a member of the Japanese Pamir Expedition, 1960, collected many plants (nos. 1-1500) in Badakhshan and Wakhan.

Wakhan is the easternmost part of Afghanistan, situated between the north part of W. Pakistan and Gornobadakshanskaya of Union of Soviet Socialist Republics.

Ab-i-Panja (R. Panjah), the upper course of Amudaria (Oxus River) run through Wakhan.

The north (U. S. S. R.) side of Ab-i-Panja was explored botanically by Ove Paulsen, a member of the Second Danish Pamir Expedition in September 1898.

The south side has been poorly known botanically.

Dr. K. Lindberg, zoologist of Sweden collected plants around Shewa (Schewa) Lake (Koul-Choghnan), Sapak Koul and Koul Mohammed Zaher in Aug. 1960.

The Japanese party climbed Mt. Noshaq (Doshak-two horned) 7490m, Wakhan in Aug. 1960, and reached at the top for the first time.

Dr. R. Yosii collected many plants at Mt. Noshaq. Mt. Noshaq belongs to Hindukush, and is near Mt. Tirich Mir of Chitral, W. Pakistan.

Accordingly some species hither to known from Gornobadakshanskaya of U. S. S. R. or Chitral of West Pakistan were newly found in Afghanistan.

The present author's Flora of Afghanistan was compiled for the first time, and was far from complete, even at the time of its publication, slipping many species which were recorded already from Afghanistan.

There are also mistakes recognized by the author himself.

To bring the Flora of Afghanistan up to date, the following additions and corrections are necessary.

In the following enumeration, the species not yet recorded in Flora of Afghanistan are printed by bold face.

In the citation of literature, Kitamura, Flora of Afghanistan (1960) is abbreviated as K. F. A.

All specimens collected by R. Yosii are here enumerated.

In the name of collector, Riozo Yosii is abbreviated as R. Y.

The present author express his sincere thanks to Prof. Riozo Yosii who collected many precious specimens during his hard travel.

He is also thankful to the Japanese taxonomists who identified these specimens; J. Ohwi (Gramineae and Cyperaceae), M. Tamura (Ranunculaceae), M. Midushima (Caryophyllacae), H. Hara (Saxifragaceae), T. Yamazaki (Scrophulariaceae), G. Murata (Labiatae).

GYMNOSPERMAE

Taxodiaceae (including *Cupressaceae**)

Juniperus polycarpos C. Koch var. seravschanica (Kom.) Kitamura, Fl. Pl. W. Pakistan 7 (1964).

Juniperus seravschanica Kom.--K. F. A. 22.

J. polycarpos C. Koch s. l.—Gilli in Fedde, Rep. LXI: 91 (1958).

Mt. Noshaq, Wakhan 3040m (July 17-20, 1960 R. Y. no. 460)—sterile, 3800-4000m (Aug. 4, 1960 R. Y. no. 581)—with fruits.

Ephedraceae

Ephedra foliata Boiss. et Kotschy.—K. F. A. 22.

Ephedra ciliata Fischer et Mey.

Ephedra oxyphlla Riedl in Symb. Afgh. V: 11, Fig. 2 (1963).

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1126).

The length of the leaves is variable.

Ephedra Gerardiana Wallich ex Stapf. in Denksch. Ak. Wien. math. naturw. Bd. LVI, 2: 75 T. III, f. XVIII, XXXI (1889).—Riedl in Symb. Afgh. V: 12 (1963).–Kitamura, Fl. Pl. W. Pakistan 9 (1964).

Distr. Afghanistan, Pam.-Al., Tianshan, W. Pakistan and Himalayas (from Kashmir to Sikkim).

Ephedra strobilacea Bunge ex A. Lehm., Rel. Bot. in Mém. Sav. Étrang.

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* The present author considers Taxodiaceae and Cupressaceae may be included in a family. The two families are alike (electromicroscopically) regarding the male gametophyte. All the species belonging to both families hither to examined, contain Hinoki flavone (a special kind of biflavones generally found in Gymnospermae) which is found only in both families.

Metasequoia which has opposite leaves and branches, is the intermediate between the two families.

VII : 499 (1851).—Riedl, Flora Iranica, Ephedraceae 2 (1963).

Distr. Iran, Gorn.-Turkm. and Afghanistan.

ANGIOSPERMAE

MONOCOTYLEDONEAE

Typhaceae

Typha minima Funk in Hoppe, Bot. Taschenb. 187 (1794).—Graebner in Pflanzenreich Heft 2: 14 (1900).—Gilli in Fedde, Rep. Sp. Nov. LXIV : 206 (1962).

Distr. Eurasia.

Sparganiaceae

Sparganium erectum L.—Kitamura, Fl. Afgh. 24.

S. stoloniferum Buch.-Ham.—Kitamura, l. c.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 977)—fr., Borak (Aug. 12, 1960 R. Y. no. 346)—fl.

Potamogetonaceae

Potamogeton crispus L., Sp. Pl. 126 (1753).—Gilli, l. c. 205 (1962).

Distr. Cosmopolitan.

Potamogeton pectinatus L.—K. F. A. 25.

Mt. Noshaq, Qasideh Village (July 11-17, 1960 R. Y. no. 383)—sterile.

Potamogeton stylatus Hagström in Bot. Notiser 1908: 98.

Distr. Afghanistan (sec Hagström).

Scheuchzeriaceae

Triglochin maritimum L., Sp. Pl. 105 (1753).—Ian Hedge and Per Wendelbo in Acta Univ. Bergensis series math.—natur. 1963 no. 18 : 32.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. nos. 375, 388).

Distr. North temp. region and South America.

Triglochin palustre L.—K. F. A. 25.

Ishkashim, Wakhan (Aug. 29-31, 1960 R. Y. nos. 877, 880), Ishkashim (Aug. 25-26, 1960 R. Y. no. 823), Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. nos 391, 461).

Gramineae by Jisaburo Ohwi

Agropyron afghanicum Melderis in Bor, Grasses of Burma, Ceylon and Pakistan 659 (1960).

Distr. Afghanistan (Khorasan).

Agropyron repens P. Beauv.—K. F. A. 27 (1960).

Ishkashim (Aug. 25-26, 1960 R. Y. nos 873, 876).

Agrostis agrostidiformis (Roshev.) Bor in Acta Univ. Bergensis ser. math.—

natur. 1963 no. 18 : 34 (1964).

Distr. Pamiro-Al. and Afghanistan.

Agrostis alba L., Sp. Pl. 63 (1753).—O. Paulsen, Pl. Olufsen's Pamir Exped. 165 (1934).—Gilli in Fedde, Rep. Sp. Nov. LXIV : 202 (1962).

Distr. Eurasia.

Agrostis canina L., Sp. Pl. 62 (1753).—Gilli, l. c. 221 (1962).

Mt. Noshaq, 3040m alt. (July 29, 1960 R. Y. no. 536), Ishkashim (Aug. 25-26, 1960 R. Y. no. 833).

Distr. Northern Hemisphere.

Agrostis gigantea Roth, Fl. Germ. I : 31 (1788).—Bor, l. c. 35 (1964).

Distr. From Europe to Himalayas.

Agrostis Munroana Aitchison et Hemsley in Journ. Linn. Soc. XIX : 192 (1882).

Calamagrostis Munroana Boiss.—Kitamura, Fl. Afgh. 31.

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1312).

Agrostis palustris Huds.—K. F. A. 27, excl. syn. Agrostis alba.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 758, 784, 786), Borak, Badakhshan (July 13, 1960 R. Y. nos. 382, 270).

Agrostis tenuis Sibth., Fl. Oxon. 36 (1794).

A. vulgaris With., Bot. Arr. Veg. Brit. ed. 3, II : 132 (1796).—Gilli, l. c. 221 (1964).

Distr. Eurasia.

Alopecurus apiatus Ovcz. in Fl. URSS II : 146, 744 (1934).—Bor. l. c. 351 (1964).

Distr. Pam.-Al. and Afghanistan.

Alopecurus arundinaceus Poiret in Lamk., Encycl. Méth. Bot. VIII : 776 (1808).

A. ventricosus Pers., Syn. I : 80 (1805) non Huds. (1778).—Gilli, l. c. 219 (1962).

Distr. Temperate parts of Eurasia.

Alopecurus himalaicus Hooker f., Fl. Brit. Ind. VII : 238 (1897).—Rech. f. et Riedl in Ann. Natur. Mus. Wien LXV : 30 (1962).—Kitamura, Fl. Pl. W. Pakistan 10 (1964).

Distr. Afghanistan, W. Pakistan, and Kashmir.

Alopecurus mucronatus Hackel ex Paulsen in Kjoeb. Vidensk. Meddel. : 162 (1903).—Bor, l. c. 35 (1964).

Distr. Pam.-Al. and Afghanistan.

Aneurolepidium dasystachys (Trin.) Nevski.—K. F. A. 28.

Mt. Noshaq (July 16-17, 1960 R. Y. nos. 407, 501), between Zebak and Borak, Badakhshan (Sept. 3, 1960 R. Y. no. 1218).

Aristida adscensionis L.—K. F. A. 29.

Furmular, Badakhshan (Sept. 5, 1960 R. Y. nos. 1034, 1036).

Aristida pennata Trin. in Mém. Acad. Sci. Pétersb. VI : 488 t. 10 (1815).—Bor, l. c. 36 (1964).

Distr. Western Europe, Caucasus, Iran, Central Asia, Afghanistan, Dz.-Kashg., and West Pakistan.

Avena Wiestii Steudel, Syn. Pl. Glum. 231 (1855).—Bor. l. c. 31 (1964).

Distr. Eastern Mediterranean Region, Caucasus and Afghanistan.

Boissiera squarrosa (Banks et Soland) Nevski.—K. F. A. 29.

Pagman, near Kabul (June 17, 1960 R. Y. no. 1158).

Bothriochloa Ischaemum Keng.—K. F. A. 29.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 839, 842).

Bromus Danthoniae Trinius.—K. F. A. 30.

Pagman (June 17, 1960 R. Y. no. 1161).

Bromus frigidus Boiss. et Haussk. ex Boiss., Fl. Orient. V : 645 (1884).—Gilli, l. c. 227 (1962).

Distr. Iran and Afghanistan.

Bromus inermis Less., Fl. Hal. 16 (1761).

Mt. Noshaq, Qasideh Valley, Wakhan 4000m (Aug. 21, 1960 R. Y. nos. 708, 710).

Distr. Eurasia.

Bromus japonicus Thunb. var. velutinus (Nocca et Balbis) Aschers. et Graeb., Syn. II : 619 (1901).—Gilli, 1. c. 228 (1962).

Bromus macrostachys Desf.—K. F. A. 31.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 31).

Bromus madritensis L., Cent. Pl. I : 5 (1755).—Bor, 1. c. 698 (1960).—Gilli, l. c. 227 (1962).

Distr. From Mediterranean Region to Afghanistan.

Bromus oxydon Schrenk in Bull. Scient. Acad. Pétersb. X : 355 (1842).—Bor, 1. c. 37 (1964).

Distr. Tianshan, Pamiro-Al., Dz.-Tarb., W. Pakistan, Kashmir, and Afghanistan.

Bromus pamiricus Drob. in Fedde, Rep. Sp. nov. XXI : 38 (1925).—Bor, 1. c. 37 (1964).

Distr. Pam.-Al. and Afghanistan.

Bromus scoparius L., Cent. Pl. I : 6 (1755).—Bor, l. c. 37 (1964).

Distr. From Europe to W. Himalaya.

Bromus sericeus Drob. in Fedde, Rep. Sp. Nov. XXI : 39 (1925).—Gilli, l. c. 229 (1962).—Bor, 1. c. 37 (1964).

Distr. Syr.-Dar., Kara-Kum., Gorn.-Turkm., Pam.-Al., and Afghanistan.

Bromus sterilis L., Sp. Pl. 77 (1753).—Gilli, 1. c. 207 (1962).—Bor, l. c. 37 (1964).

Distr. Europe, Asia minor, Central Asia, Iran and Afghanistan.

Bromus tectorum L.—K. F. A. 31.

Borak, Badakhshan (July 12-13, 1960 R. Y.), Ishkashim (Aug. 29-31, 1960 R. Y. no. 897), between Faizabad and Borak (July 7-8, 1960 R. Y. no. 108).

Bromus tomentosus Trin. in Mém. Acad. Pétersb. VI : 487 (1818).—Bor, l. c.

38 (1964).

Distr. Caucasus, Iran, and Afghanistan.

Calamagrostis dubia Bunge, Reliq. Lehm. 348 (1847).—Bor, l. c. 35 (1964).

Distr. Central Asia and Afghanistan.

Calamagrotis lanceolata Roth var. **parviflora** Harz in Bot. Centralbl. XLV: 12 (1891).—Gilli, l. c. 221 (1962).

Distr. sp. Europe, Caucasus, Siberia and Afghanistan.

Calamagrotis gigantea Roshev. in Bull. Jard. Bot. Acad. Sc. URSS XXX: 294 (1932).—Bor, l. c. 35 (1964).

Distr. Privalh. and Afghanistan.

Calamagrostis Pseudo-phragmites (Hall. f.) Koeler.—K. F. A. 31.

Mt. Noshaq 3200m (Aug. 1, 1960 R. Y. no. 541), 3040m (July 17-20, 1960 R. Y. nos. 437, 489), Borak (July 12-13, 1960 R. Y. nos. 225, 229).

Catabrosia aquatica P. Beauv., Ess. Agrost. 97 (1812).—Gilli, 1. c. 223 (1962).—Bor, l. c. 38 (1964).

Distr. Northern Hemisphere.

Colpodium himalaicum (Hooker f.) Bor, Grasses of Burma, Ceylon, India and Pakistan 529 (1960).

Distr. Kashmir, W. Pakistan and Afghanistan.

Crithopsis Delileana (Schult.) Rosh., Zlaki 319 (1937).—Bor, l. c. 43 (1964).

Distr. From Mediterranean Region to Afghanistan.

Deschampsia Koelerioides Regel in Bull. Soc. Nat. Mosc. XLI: 299 (1868).—Bor, l. c. 36 (1964).

Distr. Altai, Central Asia and Afghanistan.

Elymus dahuricus Turcz.—K. F. A. 34.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 754).

Elymus nutans Griseb. in Goett. Nachr. 72 (1868).—Kitamura, Fl. Pl. of W. Pakistan 13 (1964).

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 374).

Distr. Central Asia, Afghanistan, W. Pakistan, Himalayas, and China.

Eragrostis pilosa (L.) P. Beauv., Agrost. 162 (1812).—Gilli, l. c, 223 (1962).

Distr. Northern Hemisphere.

Eragrostis poaeoides P. Beauv.—K. F. A. 34.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 907, 908).

Eremopoa oxyglumis (Boiss.) Rosh. in Fl. URSS II: 430 (1934).—Gilli, l. c. 255 (1962).

Distr. Caucasus, Central Asia, Balk.-Asia minor, Arm.-Kurd., Iran, Ind.-Himal., and Dzung.-Kashg.

var. **alpina** (Boiss.) Gilli, l. c. 225 (1962).

P. persica r. alpina Boiss., Fl. Orient V: 610 (1884).

Distr. Asia minor, Iran and Afghanistan.

Eremopoa persica (Trin.) Rosh. in Fl. URSS II: 430. Rechinger et Riedl in Ann. Naturh. Mus. Wien LXV: 30 (1962).—Bor, l. c. 38 (1964).

Distr. Mediterranean Region, Asia minor, Caucasus, Iran, and Afghanistan.

Eremopyrun Buonapartis (Spreng.) Nevski var. sublanuginosum (Drob.) Melderis in Arkiv f. Bot. 2 ser. 2, nr. V: 305 (1952).—Bor, l, c. 43 (1964).

Distr. Caucasus, Central Asia, Asia minor, Iran, Afghanistan, W. Pakistan, and W. Himalaya.

Eremopyrum distans (C. Koch) Nevski in Fl. URSS II: 665 (1934).—Gilli, l. c. 229 (1962).—Bor, l. c. 43 (1964).

Distr. From Caucasus and Asia minor to W. Himalaya.

Festuca Danthonii Asch. et Gr., Syn. II: 550 (1901).

Vulpina ciliata Link, Hort. Berol. I: 147 (1827).—Bor, l. c. 42 (1964).

Distr. From Mediterranean Region to West Pakistan.

Festuca pratensis Huds., Fl. Angl. 37 (1762).—Bor, Grasses 540 (1960).

Distr. Eurasia.

Festuca rubra L., Sp. Pl. 74 (1753).—Gilli, l. c. 226 (1962).

Distr. Northesn Hemisphere.

Glyceria plicata Fries.—K. F. A. 36.

Ishkashim (July 16, 1960 R. Y. no. 342).

Henrardia persica var. **glaberrima** (Hausskn.) C. E. Hubbard in Blumea, Suppl. 3: 19 (1946).—Bor, Grasses 673 (1960). *Pholiurus glabriglumis* Nevski.

Distr. Probably the same as for the type.

Hordeum Bogdani Wilensky in Izv. Saratovsp. Op. Stan. 1, II: 13 (1918), in Acta Horti Petrop. XL: 248 (1928).—Bor, l. c. 44.

Ishkashim (Aug. 25-26, 1960 R. Y. no. 861), Mt. Noshaq (Aug. 16-17, 1960 R. Y. no. 1183 p.p.).

Distr. From Eastern S. Europe to Mongolia.

Hordeum glaucum Steudel, Syn. Pl. Glum. I: 352 (1854).—Bor, l. c. 44 (1964).

Distr. From Mediterranean Region to W. Pakistan.

Hordeum leporinum Link.—K. F. A. 36.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 317).

Hordeum secalinum Schreb. var. **breviglumis** Gilli, l. c. 230 (1962).

Distr. Afghanistan.

Hordeum turkestanicum Nevski.—Kitamura, Fl. Pl. W. Pakistan 15.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 488).

Distr. Afghanistan, Pam.-Al., Tianshan, Dz.-Tarb., Eastern Turkestan, W. Pakistan and Himalayas.

Koeleria cristata (L.) Pers.—Kitamura, Fl. Pl. W. Pakistan 15.—Bor, l. c. 36 (1964).

Distr. Northern Hemisphere.

Leucopoa Olgae V. Kr. et Bobr.—Kitamura, l. c. 15.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 976).

Distr. Tianshan, Pam.-Al., Afghanistan and W. Pakistan.

Leucopoa karatavica (Bunge) V. Krecz. et Bobr. in Fl. URSS II: 496 (1934).—Bor, Grasses 544 (1960), l. c. 39 (1964).

Festuca Griffithiana (St. Yves) Kriv. in Nat. Syst. URSS XVII: 70 fig. 1 (1955).—K. F. A. 36 (1960).

Gilli reported Festuca karataniva var. afghanica Gilli in Fedde, Rep. Sp. Nov. LXIV: 226 (1962).

Lolium multiflorum Lam., Fl. Fr. III: 621 (1778).—Bor, Grasses 545 (1960).

Borak (July 7, 1960 R. Y. no. 325).

Distr. Temperate parts of Eurasia and Northwest Africa.

Melica canescens Lavrenko in Fl. URSS II: 344.—Rech. f. et Riedl in Ann. Naturh. Mus. Wien LXV: 30 (1962).—Bor, l. c. 42 (1964).

Distr. Pamiro-Al., Iran, Afghanistan, W. Pakistan, and Kashmir.

Muhlenbergia himalayensis Hack. ex Hooker f., Fl. Brit. Ind. VII: 259 (1896).—Bor, l. c. 36 (1964).

Distr. Western Ghates, and from Kumaon to Afghanistan (Maymana).

Nardurus Krausei (Regel) V. Krecz. et Bobr. in Fl. URSS II: 540.—Gilli, l. c. 227 (1962).

Distr. Caucasus, Central Asia, Iran and Afghanistan.

Oryzopsis lateralis (Regel) Stapf ex Hooker f., Fl. Brit. Ind. VII: 234 (1896).—Bor, l. c. 42 (1964).

Distr. From Kunawar to Afghanistan.

Oryzopsis microcarpa Pilger in Notzbl. Bot. Gart. Berlin XIV: 346 (1939).—Bor, l. c. 43 (1964).

Distr. From Northwestern Himalaya to Afghanistan.

Oryzopsis molinioides (Boiss.) Hackel.—K. F. A. 41.

Mt. Noshaq 4000 m (Aug. 21, 1960 R. Y. no. 705), 3200m (Aug. 1, 1960 R. Y. no. 556).

Oryzopsis Munroi Stapf ex Hooker f., Fl. Brit. Ind. VII: 234 (1896).—Bor, l. c. 43 (1964).

Distr. From Garwhal to Afghanistan.

Oryzopsis pubiflora Hackel in Denkschr. Acad. Wien I: 8 (1885).—Bor, l. c. 43.

Distr. Iran and Afghanistan.

According to Bor (1960), Piptatherum barbellatum Mez. in Fedde, Rep. Sp. Nov. XVII: 211 (1921)—Afghanistan is closest to O. molinioides, but the lemma is quite different and it is a good species.

Panicum miliaceum L.—K. F. A. 41.

Between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1212).

Pennisetum flaccidum Griseb.—K. F. A. 41.

Borak (Aug. 12-13, 1960 R. Y. nos. 258, 264, 848), Borak (Sept. 4, 1960 R. Y. nos. 986, 987), between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1207).

Phalaris arundinacea L., Sp. Pl. 55 (1753).—Gilli, l. c. 219 (1962).

Distr. Northern Hemisphere.

Phleum alpinum L., Sp. Pl. 62 (1753).

Phleum commutatum Gaud. in Alpina III: 4 (1808).—K. F. A. 42.

Shewa Lake, Darwaz (Sept. 9, 1960 R. Y. no. 1038).

Phleum himalaicum Mez in Fedde, Rep. Sp. Nov. XVII: 293 (1921).—Kitamura, Fl. Pl. W. Pakistan 17 (1964).

Distr. Afghanistan, W. Pakistan and Kashmir.

Phleum montanum C. Koch in Linnaea XXI: 383 (1848).—Bor, l. c. 35 (1964).

Distr. Caucasus, Asia minor, and Afghanistan.

Phragmites communis Trinius.—K. F. A. 42.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 960).

Poa afghanica Bor in Kew Bull. 1954, 501 (1955).

Distr. Afghanistan.

Poa Aitchisonii Boiss.—K. F. A. 42.

Between Borak and Faizabad (Sept. 15, 1960 R. Y. no. 294), Ishkashim (Aug. 25-26, 1960 R. Y. no. 871).

Poa alpina L., Sp. Pl. 67 (1753).—Gilli, l. c. 224 (1962).—Bor, l. c. 39 (1964).

Distr. Cosmopolitan.

Poa annua L., Sp. Pl. 68 (1753).—Gilli, l. c. 224 (1962).

Ishkashim (Aug. 29-31, 1960 R. Y. no. 934).

Distr. Cosmopolitan.

Poa araratica Trautv. in Acta Horti Petrop. II: 486 (1873).—Kitamura, Fl. Pl. W. Pakistan 18.

Mt. Noshaq, 3200m (Aug. 1, 1960 R. Y. nos. 574, 611), 3040m (July 26, 1960 R. Y. nos. 521, 522), 3800-4000m (Aug. 4, 1960 R. Y. nos. 624, 630, 653, 655), 4000m (Aug. 21, 1960 R. Y. nos. 706, 707).

Distr. Caucasus, Arm.-Kurd., Iran, Afghanistan and W. Pakistan.

Poa bactriana Rosh. in Not. Syst. Herb. Horti Petrop. IV: 93 (1923).—Bor, l. c. 39.

Distr. Syr-Dar., Pam.-Al., and Afghanistan.

Poa bulbosa L.—K. F. A. 42.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 1168).

Poa dshilgensis Roshev. in Fl. URSS II: 377 (1934) nomen, in Acta Inst. Bot. Ac. Sc. URSS, sér. 1, II: 98 (1836).—Gilli, l. c. 225 (1962).—Bor, l. c. 39.

Distr. Syr-Dar. and Afghanistan.

Poa Nevskii Roshev. in Fl. URSS II: 377 nomen, in Acta Inst. Bot. Ac. Sc. URSS, sér. 1, II: 99 (1936).—Gilli, l. c. 224 (1962).

Distr. Pam.-Al. and Afghanistan.

Poa pratensis L., Sp. Pl. 67 (1753).—Gilli, l. c. 224 (1962).

Between Kabul and Pagman (June 17, 1960 R. Y. no. 1164).

Distr. Northern Hemisphere.

Poa Scitula Bor in Acta Univ. Berg. ser. math. rerumque naturalium 1963 no. 18 : 39 (1964).

Distr. Afghanistan.

Poa sterilis M. B., Fl. Taur.-Cauc. I : 62 (1808).—Kitamura, Fl. Pl. W. Pakistan 18 (1964).—Bor, l. c. 41 (1964).

Distr. East Europe, Caucasus, Afghanistan, W. Pakistan, and Kashmir.

Poa trivialis L.—K. F. A. 43.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 41, 42).

Pogonatherum paniceum (Lamk.) Hack. in All. Bot. Z. XII : 178 (1906).—Bor, l. c. 33.

Distr. Afghanistan, India, Burma and Ceylon.

Polypogon monspeliensis (L.) Desf.—K. F. A. 43.

Ishkashim (Aug. 25-26, 1960 R. Y. no. 872), Qasideh Village, Wakhan (Aug. 24, 1960 R. Y. no. 740).

Psathrostachys fragile (Boiss.) Nevski in Fl. URSS II : 716 (1934).

Hordeum fragile Boiss., Diag. ser. 1, VII : 128 (1846).—Bor, 1. c. 44.

Distr. Caucasus, Arm.-Kurd., Iran, and Afghanistan.

Psathrostachys lanuginosa (Trin.) Nevski in Fl. URSS II : 714 (1934).

Elymus lanuginosus Trin. in Ledeb., Fl. Alt. I : 121 (1829).—Gilli, l. c. 231 (1962).

Distr. Altai, Aralo-Casp. and Afghanistan.

Puccinellia anisoclada V. Krecz. in Fl. URSS II : 487.—Gilli, l. c. 226 (1962).

Distr. Central Asia and Afghanistan.

Puccinellia glauca V. Krecz. in Fl. URSS II : 484 pro syn. sub *Atropis glauca* (Regel) V. Krecz., l. c.—Gilli, l. c. 226 (1962).

Distr. Central Asia and Afghanistan.

Puccinellia kashmeriana Bor in Kew Bull. 1953 : 270, l. c. 41 (1964).

Distr. Afghanistan, Kashmir and Lahul.

Puccinellia pauciramea Krecz. in Fl. URSS II : 477 pro syn.—Bor, l. c. 41 (1964).

Atropis pauciramea Krecz. in Fl. URSS II : 477.

Distr. Pam.-Al., Tianshan and Afghanistan.

Roegneria canaliculata (Nevski) Ohwi comb. nov.

Andropogon canaliculatum Nevski in Bull. Jard. Bot. Acad. Sc. URSS XXX : 509 (1932).—Bor, Grasses 659 (1960).

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1072).

Distr. Afghanistan, Central Asia, Himalayas, and Tibet.

Roegneria schugnanica Nevski in Fl. URSS II : 604 (1934).—Kitamura, l. c. 19 (1964).

Andropogon schugnanica Nevski in Bull. Jard Bot. Acad. Sc. XXX : 512 (1932).—Bor, l. c. 665 (1960).

Mt. Noshaq 4000m (Aug. 21, 1960 R. Y. no. 727), (Aug. 16-17, 1960 R. Y. nos. 1182, 1183), 3800-4000m (Aug. 4, 1960 R. Y. no. 559), 3200m (Aug. 1, 1960 R. Y.

no. 555).

Distr. Pam.-Al., Karakoram, Kashmir and Afghanistan (Wakhan).

Schismus arabicus Nees, Fl. Afr. Austr. 422 (1841).—Bor, l. c. 481.—Kitamura, l. c. 19 (1964).

Ishkashim (Aug. 29-31, 1960 R. Y. no. 943).

Distr. From Mediterranean Region to Central Asia, W. Pakistan, and South Africa.

Schismus barbatus (L.) Thell.—Kitamura, l. c. 19 (1964).—Bor, l. c. 38 (1964).

Distr. Mediterranean Region to W. Pakistan, and Australia.

Sclerochloa dura (L.) P. Beauv., Ess. Agrost. 98 (1812).—Gilli, l. c. 227 (1962).

Distr. From Europe to Northwest India.

Setaria viridis P. Beuv.—K. F. A. 45.

Qasideh Village, Wakhan (Aug. 24, 1960 R. Y. nos. 742, 790), Ishkashim (Aug. 25-26, 1960 R. Y. no. 854), Mt. Noshaq (July 16-17, 1960 R. Y. no. 402), Borak, Badakhshan (July 12-13, 1960 R. Y. no. 242).

Setaria verticillata (L.) P. Beauv., Ess. Agrost. 51, 178 (1812).—Gilli, l. c. 218 (1962).

Distr. Tropics and temperate regions of the Old World.

Stipa caragana Trin.—Kitam., l. c. 20 (1964).

Lasiagrostis caragana Trin. et Rupr.—K. F. A. 37.

Stipa caucasica Schmalh. in Berichte Deutsch. Bot. Ges. X: 293 (1892).—Gilli, l. c. 220 (1962).

Distr. Caucasus. Pam.-Al., Iran, Afghanistan and Ladak.

Stipa Jacquemontii Jaub. et Spach, Ill. Or. t. 339 (1850-53).

Lasiagrostis Jacquemontii (Jaub. et Spach) Munro ex Boiss.—K. F. A. 37.

Stipa Munroana Bor in Kew Bull. 1954: 500.

Distr. Afghanistan.

Stipa orientalis Trin. in Ledeb., Fl. Alt. I: 83 (1829).—Gilli, l. c. 220 (1962).

Distr. From Siberia, Central Asia and Afghanistan to Mongolia.

Stipa Szowitsiana Trin.—K. F. A. 47.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 74).

Stipa trichoides P. Smirn. in Fedde, Rep. Sp. Nov. XXI: 233 (1925).—Gilli, l. c. 220 (1962).

Distr. Gorn.-Turkm., Pam-Al., Afghanistan.

Taeniatherum asperum (Simk.) Nevski in Fl. URSS II: 719 (1934).—Bor, l. c. 44 (1964).

Distr. Europe, Caucasus, Central Asia, Asia minor, and Afghanistan.

Trikeraia Hookeri (Stapf) Bor in Kew Bull. 1954: 555.

Stipa Hookeri Stapf in Journ. Linn. Soc. Bot. XXX: 120 (1894).—Gilli, l. c. 220 (1962).

Distr. Afghanistan, India and Tibet. Alpine Region.

Triticum boeoticum Boiss., Diag. ser. 1, XIII : 69 (1853).—Bor, l. c. 44 (1964).
Distr. Afghanistan.

Triticum compactum Host, Gram. Austr. IV : 4 tab. 7 (1809).—Gilli, l. c. 230 (1962).
Distr. cult.

Cyperaceae by J. Ohwi

Carex arcatica Meinsh. in Acta Horti Petrop. XVIII, 3 : 336 (1901).—V. Krecz. in Fl. URSS III : 225.

Mt. Noshaq, Qasideh Village (Jul. 16–17, 1960 R. Y. no. 390), Qasideh Valley 3040m (Jul. 17–20, 1960 R. Y. nos. 466, 467), (Jul. 26, 1960 R. Y. no. 510), Borak, Badakhshan (Sept. 4, 1960 R. Y.).

Distr. Central Asia, Afghanistan, and Northwest China.

Carex heterostachya Bunge.—K. F. A. 50.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 45, 1165).

Carex infuscata Nees.—K. F. A. 50.

Mt. Noshaq, Qasideh Village (July 16–17, 1960 R. Y. no. 1175).

Carex melanantha C. A. Mey.—K. F. A. 50.

Mt. Noshaq, Qasideh Valley 4000–4500m (Aug. 10–15, 1960 R. Y. no. 669), 4000 m (Aug. 21, 1960 R. Y. nos. 682, 683), 3800–4000m (Aug. 4, 1960 R. Y. no. 635).

Nuristan : Shabul Gul. (Aug. 6, 1955 S. K.).

Carex microglochin Wahlenb. in Vetensk. Ak. Nya Handl. XXIV : 140 (1803). —Gilli, l. c. 215 (1962).

Distr. Northern Hemisphere.

Carex nivalis Boott var **Griffithii** (Boott) Koyama in Acta Phytotax. Geobot. XVII : 100 (1958).—Gilli l. c. 217 (1962).

Distr. Afghanistan, W Pakistan, Tianshan, Pam.-Al., and Kashmir.

Carex nubigena D. Don var. **brevibracteata** Gilli, l. c. 216 (1962).

Distr. var. Afghanistan.

Carex Oederi Retz.—K. F. A. 51.

Ishikashim (Aug. 29–31, 1960 R. Y. no. 882).

Carex Oliveri Boecklr. in Flora LXIII (1880) : 455.—Krecz. in Fl. URSS III : 280, Tab. XIII fig. 1.

Mt. Noshaq, Qasideh Valley 4000m (Aug. 4, 1960 R. Y. no. 1190), 3800–4000m (Aug. 4, 1960 R. Y. no. 631), 4000–4500m (Aug. 10–15, 1960 R. Y. nos. 677, 678).

Distr. Afghanistan and Pam.-Al.

Carex orbicularis Boott.—K. F. A. 51.

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1300).

Carex pseudo-foetida Kükenthal.—K. F. A. 51.

Mt. Noshaq, Qasideh Valley 4000–4500m (Aug. 10–15, 1960 R. Y. nos. 665, 670), Borak (Sept. 12, 1960 R. Y. no. 1102), Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1069).

Cobresia Royleana (Nees) Boeck. var. **bracteata** Gilli in Fedde, Rep. Sp. Nov. LXIV: 215 (1962).

Distr. var. Afghanistan.

Cyperus aristatus (L.) Rottb., Desc. Nov. Pl. 23 (1773).—Gilli, l. c. 213 (1962).

Distr. Africa, Afghanistan, Himalayas, India, West China, Cochin-China, Australia, and South America.

Cyperus rotundus L.—K. F. A. 55.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1021), (Aug. 12, 1960 R. Y. no. 345).

Eleocharis acicularis (L.) R. Br., Prodr. 224 (1810).—Gilli, l. c. 214 (1962).

Distr. Northern Hemisphere.

Eleocharis carniolica C. Koch, Syn. ed. 2: 853 (1844).—Gilli, l. c. 215 (1962).

Distr. Europe, Asia minor and Afghanistan.

Eleocharis meridionalis Zinserl. in Fl. URSS III: 69, 580, Tab. VI, 2 (1935).

Mt. Noshaq, Qasideh Village (Jul. 16-17, 1960 R. Y. no. 1181), Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1309).

Distr. Caucasus, Central Asia, Afghanistan, and Western China.

Scirpus planifolius Grimm.—K. F. A. 59.

Mt. Noshaq, Qasideh Village (Jul. 16-17, 1960 R. Y. no. 1179, Ishkashim (Aug. 25-26, 1960 R. Y. no. 831).

Scirpus setaceus L.—K. F. A. 59.

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1075).

Trichophorum pumilum (Vahl) Schinz et Thell. in Vierteljahrs-schrift d. Naturf. Gesellsch. in Zürich LXVI: 265 (1921).

Trichophorum atrichum Palla in Engler, Bot. Jahrb. X: 296 (1889).—Gilli, l. c. 213 (1962).

Distr. Europe, Siberia, Central Asia, Iran, Afghanistan, Mongolia, Dz.-Kashg. and North America.

Araceae

Acorus Calamus L., Sp. Pl. 324 (1753).—Gilli, l. c. 205 (1962).—Riedl in Symb. Afgh. V: 265 (1964).

Distr. Eurasia.

Arum Korolkowii Regel in Acta Horti Petrop. II: 407 (1877).—Riedl, l. c. 264.

Distr. Central Asia, Iran, Afghanistan, and Dz.-Kashg.

Eminium Alberti (Regel) Engler, Pflanzenr. IV, 23 F: 131 (1920).—Riedl. l. c. 263 (1964).

Distr. Kara-Kum., Gorn.-Turkm., and Afghanistan.

Lemnaceae

Lemna minor L., Sp. Pl. 970 (1753).—Gilli, l. c. 205 (1962).

Distr. Northern Hemisphere.

Juncaceae

Juncus articulatus L.—K. F. A. 62.

Borak, Badakhshan (Sept. 4, 1960 R. Yosii nos. 993, 1001, 1002), (July 7, 1960 R. Yosii no. 300), Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 414), Ishkashim (Aug. 29-31, 1960 R. Y. nos. 876, 893, 885, 887, 884, 880).

Juncus bufonis L.—K. F. A. 63.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 552), (Aug. 25-26, 1960 R. Y. no. 812).

Juncus himalensis Klotzsch & Garcke in Bot. Reise Pr. Waldem. 60 t. 97 (1862). —Ian Hedge and Wendelbo in Acta Univ. Bergensis Series Math. Natur. 1963 no. 18: 33.—Kitamura, Fl. Pl. W. Pakistan 31.

Nuristan: Shabul Gul (Aug. 6, 1955 S. Kitamura).

Distr. Pam.-Al., Afghanistan, W. Pakistan and Himalayas (to Bhutan).

Juncus inflexus L. var. brachytepals (Trautv.) Kitamura, Fl. Afgh. 63.

Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 282).

Juncus sphacelatus Decne. in Jacquemont, Voyage Ind. IV: t. 172 (1844).—Fr. Buchenau in Pflanzenreich, Heft XXV: 233 (1906).—Gilli in Fedde, Rep. Sp. Nov. LXIV: 213 (1962).

Distr. Afghanistan, Turkestan and Himalayas (From Kashmir to Sikkim.).

Liliaceae

Allium Barszczewskii Lipsky in Acta Horti Petrop. XVIII: 114 (1900).—Wendelbo in Nytt Magasin for Botanikk X: 81 (1963).

Distr. Pam.-Al., Tianshan and Afghanistan.

Allium Carolinianum DC. in Redonté, Liliac. II: t. 101 (1804).—Stearn in Bull Brit. Mus. Bot. II: 173 (1960).—Kitamura, Fl. Pl. W. Pakistan 32.

Allium blandum Wall.—K. F. A. 64.

Mt. Noshaq, Qasideh Valley 4000m (Aug. 21, 1960 R. Y. no. 689), 3500m (Aug. 1, 1960 R. Y. no. 528).

Allium lineare L., Sp. Pl. 295 (1753).—Gilli in Fedde, Rep. Sp. Nov. LXIV: 210 (1962).

Distr. Europe, Siberia, Central Asia, Afghanistan, and Mongolia.

Allium margaritaceum Sm. var. **affine** (Ledeb.) Regel in Acta Horti Petrop. III: 50 (1875).—Gilli, l. c. 209 (1962).

Distr. Caucasus, Iran and Afghanistan.

Allium oreophiloides Regel in Acta Horti Petrop. III: 114 (1875).—Wendelbo in Nytt Mag. for Botanikk X: 81 (1963).

Distr. Pam.-Al., Tianshan and Afghanistan.

Allium Pallasii Murr. var. **nitidulum** Fischer.—Gilli, l. c. 209 (1962).

Distr. sp. Siberia, Central Asia, Dzung.-Kashg. and Afghanistan.

Allium turcomanicum Regel in Acta Horti Petrop. X: 305 (1887).—Wendelbo, l. c. 81 (1963).

Distr. Central Asia and Afghanistan.

Bellevalia atroviolacea Regel in Acta Horti Petrop. VIII, 2 : 655 (1833).—Gilli, l. c. 211 (1962).

Distr. Pam.-Al. and Afghanistan.

Eremurus albo-roseus Wendelbo in Acta Univ. Berg. Serses Mat. Naturv. 1964 no. 5 : 22.

Distr. Afghanistan.

Eremurus Kaufmanni Regel.—K. F. A. 70.

E. Schievanus O. Fedsch.—K. F. A. 70.

Eremurus solitarius Hashimoto in Japanese Journ. Botany XXXIX : 26 (1964).

Distr. Afghanistan.

Eremurus spectabilis M. B. var. **viridiflora** Gilli, l. c. 27 (1962).

Distr. Afghanistan.

Eremurus stenophyllus (Boiss. et Buhse) Baker subsp. aurantiacus (Baker) Wendelbo, l. c. 1964 no 5 : 14.

E. aurantiacus Baker.

E. stenophyllus auct.—K. F. A. 71.

Istalif (June 25, 1960 R. Y. no. 79), Mt. Noshaq, Qasideh Village (Aug. 16-17, 1960 R. Y. no. 400 p. p)—fl. et fr.

Tulipa sogdiana Bunge in Mém. Acad. Pétersb. Sav. Étrang. VII : 514 (1854).—Gilli, l. c. 208 (1962).

Distr. Kyz.-Kum., Kara-Kum., Amu-Dar. and Afghanistan.

Tulipa Wilsoniana Hoog in Gard. Chron. 1902 II : 50

var. afghanica Hashimoto in Jap. Journ. Bot. XXXIX : 27 (1964).

V. linifolia auct.—K. F. A. 75.

Distr. var. Afghanistan.

Orchidaceae

Epipactis Royleana Lindley.—K. F. A. 78.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1011), (July 7, 1960 R. Y. no. 314).

Listera ovata (L.) R. Br. in Ait., Hort. Kew. ed. II, V : 201 (1813).—Gilli, l. c. 206 (1962).

Distr. Europe, Asia minor, Caucasus, Siberia, Tianshan, and Afghanistan.

Orchis latifolia L.—K. F. A. 79.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. nos. 384, 548, 1174), (July 17-20, 1960 R. Y. no. 431).

Spiranthes sinensis (Pers.) Ames subsp. **australis** (R. Br.) Kitamura in Acta Phytotax. Geobot. XXI : 23 (1964).

S. australis Lindley.-Hooker f., Fl. Brit. Ind. VI : 102.

Distr. From Afghanistan to Japan and Australia.

Zeuxine strateumatica (L.) Schltr., Orch. Dtsch. Neu.-Guin. 77 (1911).

Orchis strateumatica L., Sp. Pl. 743 (1753).

Zeuxine sulcata Lindley.-Gilli, l. c. 206.

Distr. Afghanistan, India, Malaysia, and Southern Japan.

DICOTYLEDONEAE

CHORIPETALAE

Salicaceae

Populus canascens (Ait.) Smith, Fl. Brit. III: 1080 (1805).—Komarov in Fl. URSS V: 226 (1936).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 240 (1963).

Distr. A native of Europe and W. Asia. Cultivated in Afghanistan.

Populus nigra L. var. italica (Münchh) Koehne.-K.. F. A. 80.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 964)-sterile.

Populus pruinosa Schrenk in Bull. Acad. Pétersb. III: 210 (1845).—Komarov in Fl. URSS V: 223, Tab. X, Fig. 5 (1936).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 240 (1963).

Distr. Central Asia, Iran, Afghanistan, and Dz.-Kashg.

Populus usbekistanica Komarov in Jour. de Bot. de l'URSS no. 51: 501 (1934), Fl. URSS V: 234.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 965)-sterile.

Distr. Afghanistan (Wakhan), Pam.-Al., and W. Pakistan.

Salix acmophylla Boiss.—K. F. A. 80.

Kandahar (June 6, 1955 S. K.)-sterile, pendulous, erroneously placed under S. babylonica L.—K. F. A. 81.

Salix aegyptiaca L., Cent. Pl. I: 33 (1755).—Nasarov in Fl. URSS V: 94, Tab. V, Fig. 9 (1936).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 239 (1963).

Nuristan: Shabul Gul (Aug. 6, 1955 S. Kitamura)-sterile.

Distr. Mediterranean Region, Caucasus, Central Asia, Iran, and Afghanistan.

Salix alba L. var. **vittellina** (L.) Stokes, Bot. Mat. Med. IV: 506 (1812).

Salix vittellina L., Sp. Pl. 1016 (1753).—Gilli, l. c. 240 (1963).

Salix Blakii Görz in Fedde, Rep. Sp. Nov. XXXVI: 31 (1934).—Nasarov, l. c. 162.—Gilli, l. c. : 240 (f. linearis Görz).

Distr. Central Asia and Afghanistan.

Salix denticulata Anders. in Svensk Vetensk. Akad. Handl. 1850: 481, Reise Pr. Wald. 119, t. 89 (1862).

Salix elegans Wall. ex Anders. in DC., Prodr. XVI 2: 256 (1868).—K. F. A. 81.

Salix hastata L., Sp. Pl. 1017 (1753).—Nasarov, l. c. 116, Tab. IV, Fig. 3 (1936).—Gilli, l. c. 240 (1963).

Distr. Europe, Siberia, Central Asia, Mongolia, Afghanistan, and Himalayas.

Salix sarawschanica Regel, Pl. Novae Fedsch. 80 (1881).—Nasarov, l. c. 160.—Gilli, l. c. 240 (1963).

Distr. Pam.-Al. and Afghanistan.

Salix triandra L., Sp. Pl. 1016 (1753).—Nasarov, l. c. 184, Tab. IX, Fig. 7 (1936).—Gilli, l. c. 240 (1963).

Distr. Europe, Asia minor, Siberia, Central Asia, Iran, Afghanistan, and Mongolia.

Juglandaceae

Juglans regia L. subsp. fallax (Dode) Popov.-K. F. A. 82.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 30, 58)—with young fruits.

Juglans regia L., Sp. Pl. 997 (1753) subsp. *regia.*

Istalif (June 25, 1960 R. Y. no. 81)—with young fruits. Probably cultivated.

Betulaceae

Betula utilis Don subsp. Jacquemontii (Spach) Kitamura, Fl. Pl. W. Pakistan 37 (1964).

Betula Jacquemontii Spach.-K. F. A. 82.

Mt. Noshaq, Qasideh Valley 3040m (July 21, 1960 R. Y. no. 492)-sterile.

Ulmaceae

Celtis caucasica Willd.—K. F. A. 84.

Borak, Badakhshan (July 12-13, 1960 R. Y. no. 211)—sterile.

Ulmus glabra Hudson.-K. F. A. 84.

Istalif (June 25, 1960 R. Y. no. 80)—sterile.

Moraceae

Ficus Carica L. var. Johannis Boiss.—K. F. A. 84.

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1131)—sterile.

A. Gilli reported Ficus Carica L. var. rupestris Haussk. ex Boiss., Fl. Or. IV: 1154 (1879) from Nuristan, in Fedde, Rep. Sp. Nov. LXVIII: 241 (1963).

Morus alba L.—K. F. A. 86.

Borak, Badakhshan (July 12-13, 1960 R. Y. nos. 228, 224, 221).

Urticaceae

Urtica dioica L.—K. F. A. 86.

Pagman (June 17, 1960 R. Y. nos. 35, 37, 38), Ishkashim (Aug. 29-31, 1960 R. Y. no. 891).

Cannabinaceae

Cannabis sativa L.—K. F. A. 87.

Borak, Badakhshan (July 12-13, 1960 R. Y. no. 240), (July 7, 1960 R. Y. no. 263), between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1206).

Polygonaceae

Atraphaxis afghanica Meisn.—K. F. A. 88 errore affghanica.

Between Zebak and Borak, Badakhshan (Sept. 3, 1960 R. Y. no. 1214).

Atraphaxis pyrifolia Bunge in Mém. Acad. Pétersb. Sav. Étrang. VII: 482 (1852).—Parelov. in Fl. URSS V: 518.—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 243 (1963).

Distr. Pribalh., Tianshan, Syr-Dar., Amu-Dar., Pam.-Al., and Afghanistan.

Fagopyrum tataricum Gaertner, Fruct. II: 182, t. 119, f. 6 (1791).

Fagopyrum esculentum non Moench.—K. F. A. 88 errore determ.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 377), Ishkashim (Aug. 25-26, 1960 R. Y. nos. 843, 844).

Nuristan: Between Pronz and Eschtaway (Aug. 5, 1955 S. Kitamura).

Distr. A native of Eurasia, weed in cultivated field.

Oxyria digyna (L.) Hill.-K. F. A. 88.

Mt. Noshaq, Qasideh Valley 4000m (Aug. 21, 1960 R. Y. no. 715), 3800-4000m (Aug. 4, 1960 R. Y. no. 610).

Polygonum acerosun Ledeb. ex Meisn. in DC., Prodr. XIV: 92 (1857).—Komarov in Fl. URSS V: 625, Tab. XLII, Fig. 5 (1936).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 244 (1963).

Distr. Central Asia and Afghanistan.

Polygonum alpinum All.—K. F. A. 88.

Mt. Noshaq, Qasideh Valley 3040m (July 17-20, 1960 R. Y. no. 481).

Polygonum argyrocoleon Steud.—K. F. A. 89.

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. no. 1041).

Polygonum aviculare L.—K. F. A. 89.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 858, 868, 859, 851), between Kotal-i-Bonarat and Doab (Sept. 6, 1960 R. Y. no. 1055).

Polygonum bucharicum Grig. in Fl. et Syst. I: 102 (1933), in Fl. URSS V: 664, Tab. XLV, fig 4 (1936).—Rech. et Riedl in Ann. Naturh. Mus. Wien LXV: 30 (1962).

Distr. Pam.-Al., Tianshan, Dz.-Kashg. and Afghanistan.

Polygonum cashmirense H. Gross. in Engler, Bot. Jahrb. XLIX: 342 (1913).—Rech. et Riedl, l. c. 30 (1962).

Distr. Afghanistan and Kashmir.

Polygonum Convolvulus L.—K. F. A. 89.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 981).

Polygonum Hydropiper L., Sp. Pl. 361 (1753).—Kitamura, Fl. Pl. W. Pakistan 44 (1964).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 243 (1963).

Distr. A cosmopolitan weed.

Polygonum lapathifolium L.—K. F. A. 91.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 109), Ishkashim (Aug.

25-26, 1960 R. Y. nos. 802, 830).

Polygonum molliaeforme Boiss., Diag. Ser. I, VII: 84 (1846), Fl. Or. IV: 1043. —Komarov in Fl. URSS V: 639 (1936).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 245 (1963).

Mt. Noshaq, Qasideh Valley 3200m (Aug. 1, 1960 R. Y. no. 614).

Distr. Syr-Dar., Pam.-Al., Iran and Afghanistan.

Polygonum myrtillifolium Komarov in Fl. URSS V: 608, 718, Tab. XXXIX, fig. 3 (1936).-Rech. et Riedl, l. c. 30 (1962).

Distr. Pam.-Al. and Afghanistan.

Polygonum nepalense Meisn. f. scabridum (Meisn.) Kitamura, F. A. 92.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1005), (July 12-13, 1960 R. Y. no. 210), Ishkashim (Aug. 25-26, 1960 R. Y. no. 874).

Polygonum Olivierii Jaub. et Sp., Ill. Pl. II: 31, tab. 121 (1844).-Gilli, l. c. 244 (1963).

Distr. Iraq, Iran and Afghanistan.

Polygonum paronychioides C. A. Mey.-K. F. A. 94.

Mt. Noshaq, Qasideh Valley 3800-4000m (Aug. 4, 1960 R. Y. no. 659), 3200m (Aug. 1, 1960 R. Y. no. 577).

Pteropyrum Olivierii Jaub. et Spach var. **scabrida** Gilli, l. c. 242 (1963).

Distr. var. Afghanistan.

Rheum tibeticum Maxim.-K. F. A. 95.

Mt. Noshaq, Qasideh Valley 3800-4000m (Aug. 4, 1960 R. Y. nos. 609, 608) -fr.

Polygonum tubulosum Boiss., Diagn. Ser. I, I: 83 (1842), Fl. Orient. IV: 1032 (1879).-Hooker f., Fl. Brit. Ind. V: 27 (1886).—Gilli in Fedde, Rep. Sp. Nov. LXVIII: 244 (1963).

Distr. Iran, Afghanistan and Himalayas.

Rumex crispus L.-K. F. A. 95.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 939, 961).

Chenopodiaceae

Anabasis annua Bunge, Anab. Rev. 46 (1862).-Gilli in Fedde, Rep. Sp. Nov. XLVIII: 250.

Distr. Iran and Afghanistan (identification by leaves).

Anabasis bamianica Aellen in Acta Univ. Berg. Series Math.-Natur. 1963 no. 18: 48 (1964).

Distr. Afghanistan.

Arthrophytum gracile Aellen in Acta Univ. Berge. Series Math.-Natur. 1963 no. 18: 47 (1964).

Distr. Afghanistan.

Arthrophytum Lindbergii Aellen, l. c. 47 (1964).

Distr. Afghanistan.

Atriplex dimorphostegia Kar. et Kir. var. **sagittiformis** Aellen, l. c. 45 (1964).

Distr. Afghanistan.

Atriplex nitens Schkuhr, Handb. III: 541 (1803).-Gilli, l. c. 246 (1963).

Distr. Europe, Caucasus, W. Siberia, Central Asia, Asia minor, Arm.-Kurd., Iran, Afghanistan and Dz.-Kashg.

Atriplex tatarica L. var. **virgata** Boiss., Fl. Or. IV: 910 (1879).-Gilli, l. c. 246 (1963).

Distr. sp. Eurasia.

Atriplex Wendelboi Aellen, l. c. 46 (1964).

Distr. Afghanistan.

Camphorosma Lessingii Litw. in Trav. Mus. Bot. Acad. St. Pétersb. II: 96 (1905).-Gilli, l. c. 247 (1963).

Distr. From W. Europe to Mongolia.

Camphorosma monspeliana L., Sp. Pl. 112 (1753).-Aellen, l. c. 46 (1964).

Distr. Europe, Caucasus, Asia minor, W. Siberia, Central Asia and Afghanistan.

Ceratocarpus arenarius L.-K. F. A. 98. *C. turkestanicus* Sav.-Rycz.

Borak, Badakhshan (Sept. 12, 1960 R. Y. nos. 993, 1129).

Chenopodium Botrys L.-K. F. A. 99.

Zebak, Badakhshan (Aug. 15, 1960 R. Y. no. 348), Ishkashim (Aug. 29-31, 1960 R. Y. no. 773), (Aug. 25-26, 1960 R. Y. nos. 805, 806, 807).

Chenopodium glaucum L.-K. F. A. 99.

Ishkashim (Aug. 25-26, 1960 R. Y. no. 813).

Chenopodium Korshinskyi Litw. in Trav. Mus. Bot. VII: 77 (1910).-Gilli, l. c. LXVIII: 246 (1963).

Distr. Pam.-Al. and Afghanistan.

Chenopodium serotinum L., Cent. Pl. II: 12 (1756). *C. ficifolium* Sm.

Ishkashim (Aug. 25-26, 1960 R. Y. no. 815), Kandahar (June 8, 1955 S. K.).

Distr. Eurasia.

Chenopodium urbicum L., Sp. Pl. 218 (1753).-Gilli in Fedde, Rep. Sp. Nov. LXVIII: 246 (1963).

Distr. Eurasia.

Eurotia ceratoides C. A. Mey.-K. F. A. 100.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 956), (Aug. 29-31, 1960 R. Y. no. 935), (Aug. 25-26, 1960 R. Y. no. 820), Borak (Aug. 12-13, 1960 R. Y. nos. 241, 613)-ante anthesin.

Eremochion pungens Gilli in Fedde, Rep. Sp. Nov. XLII: 23, Fig. 1 (1959).

Distr. Afghanistan.

Girgensohnia diptera Bunge, Reliq. Lehm. 303 (1851), Anabas. Rev. 33 (1862).-Gilli, l. c. 250 (1963).

Distr. Syr-Dar., Pam.-Al. and Afghanistan.

Halocharis hispida Bunge.-K. F. A. 101.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 91).

Kochia stellaris Moq., Chenopod. Enum. 93 (1840).-Aellen, l. c. 46 (1964).

Distr. Iran and Afghanistan.

Salsola bamianica Gilli in Fedde, Rep. LXII : 24, Fig. 2 (1959), l. c. LXVIII : 249 (1963).

Distr. Afghanistan.

Salsola brachiata Pallas, Illustr. 30 (1803).-Gilli, l. c. 249 (1963).

Distr. Europe, Caucasus, W. Siberia, Central Asia, Afghanistan, Dz.-Kashg. and Mongolia.

Salsola canescens (Moq.) Boiss., Fl. Orient. IV : 963 (1879).-Gilli, l. c. 249 (1963).

Distr. Asia minor, Iran and Afghanistan.

Salsola glauca M. Bieb., Tabl. d. Prov. Occ. Casp. 112 (1798).-Iljin in Fl. URSS VI : 246 (1936).

Aellenia glauca (M. Bieb.) Aellen in Verh. Nat. Ges. Basel LXI : 182 (1950), l. c. 47 (1964).

Distr. Caucasus, Tianshan, Syr-Dar., Gorn.-Turkum., Iran and Afghanistan.

Salsola gobicola Iljin in Not. Syst. Herb. Inst. Bot. Acad. Sci. URSS XVII : 124, fig. 2, 3 (1955).-Aellen, l. c. 46 (1964).

Distr. Mongolia and Afghanistan.

Salsola lanata Pallas, It. II app. 736 (1773).-Gilli, l. c. 249 (1963).

Distr. Nyz.-Borg., Central Asia, Iran, Afghanistan and Dz.-Kashg.

Salsola Paulsenii Litv.-K. F. A. 105.

Borak (Sept. 12, 1960 R. Y. no. 1127), between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1213).

Salsola pellucida Litv. in Sched. ad Herb. Fl. Ross VIII : 16 (1922).-Aellen, l. c. 46 (1964).

Distr. Nizn.-Bolg., Caucasus, Central Asia, Afghanistan and Dz.-Kashg.

Salsola rigida Pallas, Illustr. 20 (1803).-Gilli, l. c. 249 (1963).

Distr. Caucasus, Central Asia, Iran, Afghanistan and Dz.-Kashg.

Suaeda altissima (L.) Pallas, Illustr. 49 (1803).-Gilli, l. c. 248 (1963).

Distr. Europe, Caucasus, Altai, Central Asia, Balkan, Asia minor, Iran, Afghanistan, Dz.-Kashg. and Mongolia.

Suaeda heterophylla Bunge.-K. F. A. 106.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 921, 922).

Suaeda transoxana (Bunge) Boiss., Fl. Orient. IV : 943 (1879).-Gilli, l. c. 248 (1963).

Distr. Central Asia, Iran, and Afghanistan.

Amaranthaceae

Amaranthus graecizans L., Sp. Pl. 990 p. p. (1753).-Vassil. in Fl. URSS VI :

365, Tab. XVIII, Fig. 9a, b (1936).

Amaranthus angustifolius Lam. var. *graecizans* (L.p.p.) Thellung.-Gilli in Fedde, Rep. Sp. Nov. LXVIII: 251 (1963).

Distr. A native of North America, now naturalized widely in the world.

Amaranthus spinosus L., Sp. Pl. 991 (1753).-Gilli, l. c. 250 (1963).

Distr. A native of Tropical America, now naturalized in the warm regions of the world.

Caryophyllaceae by M. Mizushima

Acanthophyllum squarrosum Boiss.-K. F. A. 109.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 1).

Arenaria Balansae Boiss., Fl. Orient. II: 700 (1869).-Gilli in Fedde, Rep. LXVIII: 257 (1963).

Distr. Asia minor, Iran and Afghanistan.

Arenaria leptoclados Guss. var. **viscidula** Rouy et Fouc.-Gilli, l. c. 257 (1963).

Arenaria serpyllifolia L.-K. F. A. 109.

var. serpyllifolia.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 909, 910), (Aug. 25-26, 1960 R. Y. no. 803).

var. **afghanica** Gilli in Fedde, Rep. Sp. Nov. LXVIII: 257 (1963).

Distr. var. Afghanistan.

Cerastium anomalum Waldst. et Kit. in Willd., Sp. Pl. II: 812 (1798).-Schischkin in Fl. URSS VI: 436, Tab. XXII, Fig. 9 (1936).-Gilli, l. c. 258 (1963).

Distr. Europe, Western Asia, Central Asia, Iran and Afghanistan.

Cerastium balearicum Hermann in Verk. Bot. Ver. Brand. LIV: 247 (1913) in obs.-Gilli, l. c. 258 (1963).

Cerastium dentatum Möschl. in Oesterr. Bot. Zeitschr. LXXXII 3: 230 (1933).-Schischkin, l. c. 451 (1936).

Distr. Europe, Caucasus, Syr-Dar., Pam.-Al. and Afghanistan.

Cerastium cerastoides Britton.-K. F. A. 110.

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1025).

Cerastium inflatum Link in Desf., Cat. Hort. Par. 462 (1878).-Boiss., Fl. Or. I: 721.-Schischkin, l. c. 447, Tab. XXIII, Fig. 6 (1936).-Gilli, l. c. 258 (1963).

Distr. Asia minor, Caucasus, Arm.-Kurd., Iran, Central Asia and Afghanistan.

Cerastium viscosum L.-K. F. A. 110.

Borak, Badakhshan (Sept. 13, 1960 R. Y. no. 1128).

Dianthus anatolicus Boiss., Diag. Ser. I, I: 22 (1842), Fl. Or. I: 489 (1867).-Gilli, l. c. 251 (1963).

Distr. Asia minor and Afghanistan.

Dianthus Lindbergii H. Riedl in Ann. Naturh. Mus. Wien LXV: 30 (1962).

Distr. Afghanistan (Shewa Lake).

Gypsophila acerosa Boiss. var. **scapiflora** (Akhtar) Gilli, l. c. 253.

Gypsophila scapiflora Akhtar in Indian Forester LXV: 606 (1939).

Distr. var. Afghanistan.

Gypsophila lignosa Hemsley et Lace in Journ. Linn. Soc. XXVII: 322 (1891). -Gilli, l. c. 252 (1963).

Distr. Afghanistan and W. Pakistan.

Gypsophila sedifolia Kurz in Flora LV: 285 (1872).-Edgew. et Hooker f. in Fl. Brit. Ind. I: 217 (1874).-Gilli, l. c. 252 (1963).

Distr. Afghanistan and Himalayas (Zanskar, Dras).

Lepyrodiclis holosteoides Fischer el Mey.-K. F. A. 113.

Borak, Badakhshan (Sept. 4, 1960 R. Y. nos. 978, 982), Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 423), between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1208).

Minuartia Aucheriana (Boiss.) Bornm. β. **procera** Fenzl ex Bornm. in Beih. Bot. Centralbl. XXVII, II: 318 (1910).-Gilli, l. c. 256 (1963).

Alsine Aucheriana Boiss., Diag. Ser. I, I: 50 (1842), Ser. II, VIII: 100 (1849). β. *procera* Boiss., Fl. Or. I: 678 (1867).

Distr. Iran and Afghanistan.

Sagina saginoides (L.) Dalla Torre, Anl. Beobacht. Alpenpfl. 189 (1882).-Steinb. in. Fl. URSS VI: 472.-Gilli, l. c. 255 (1963).

Nuristan (Aug. 6, 1955 S. Kitamura)-erroneously placed under S. procumbens L.-K. F. A. 114.

Spergula saginoides L., Sp. Pl. 441 (1753).

Distr. Northern Hemisphere.

Saponaria Griffithiana Boiss.-K. F. A. 114.

Mt. Noshaq, Qasideh Valley 3040m (July 29, 1960 R. Y. nos. 544, 545), (July 17-20, 1960 R. Y. no. 477), Qasideh Village (Aug. 24, 1960 R. Y. no. 741), Ishkashim (Aug. 29-31, 1960 R. Y. no. 898).

Silene conoidea L.-K. F. A. 115.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 759, 937), (Aug. 26, 1960 R. Y. no. 837), Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. nos. 418, 537).

Silene Griffithii Boiss.-K. F. A. 116.

Gilli reported Melandrium Griffithii (Boiss.) Rohrb. var. pseudoverticillata Gilli from Afghanistan in Fedde, Rep. Sp. Nov. LXVIII: 255 (1963).

Silene guntensis B. Fedtsh. in Trud. Botan. Muz. Akad. Nauk v Spb I: 119 (1902) nomen.-Schischkin in Fl. URSS VI: 672, Tab. XXXIX, Fig. 2 (1936).-Gilli, l. c. 254 (1963).

Distr. Tianshan, Pam.-Al., Afghanistan and Iran.

Silene leptocaulis Schischkin in Flora et Systematica III: 177 (1937), Fl. URSS VI: 64 rossice (1936).-Gilli, l. c. 255 (1963).

Distr. Pam.-Al. and Afghanistan.

Silene ovalifolia (Regel et Schmalh.) Popov in Acta Univ. As. Med. Ser. VIII b, Bot. Fasc. 3: 996 (1928).

Melandrium ovalifolium Regel et Schmalh. ex Regel, Pl. Nov. Fedsch. 15 (1882).-Tolmatchev in Fl. URSS VI: 704, Tab. XLIII, Fig. 2 (1936).-Gilli, l. c. 255 (1963).

Distr. Tianshan, Pam.-Al. and Afghanistan.

Silene pamirensis (H. Winkler) Preobr. in Flora et Systematica II: 151 (1936). -Schischkin in Fl. URSS VI: 670, Tab. XXXIX, Fig. 3 (1936).-Gilli, l. c. 254 (1963).

Distr. Central Asia and Afghanistan.

Stellaria fontana M. Pop. in Fl. URSS VI: 407, 881 (1936).-Gilli, l. c. 258 (1963).

Distr. Pam.-Al. and Afghanistan.

Stellaria Kotschyana Fenzl.-K. F. A. 117.

var. **longicalyx** Gilli, l. c. 258 (1963).

Distr. var. Afghanistan.

Stellaria media Villars.-K. F. A. 117.

var. media.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 798, 799).

Vaccaria pyramidata Medic., Phil. Bot. I: 96 (1789).

Vaccaria segetalis (Neck.) Garcke nom. illeg.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 821, 825, 817), Borak, Badakhshan (July, 12-13, 1960 R. Y. no. 587).

Distr. Eurasia.

Velezia rigida L.-K. F. A. 118.

Ishkashim (July 16, 1960 R. Y. no. 344).

Ranunculaceae by Michio Tamura

Aconitum tapeinocranum Rech. f. in Anzeiger math.-naturw. Österr. Akad. Wissensch. XCI: 71 (1954).

Between Shewa Lake and Doab, Darwaz (Sept. 9, 1960 R. Y. no 1084).

Distr. Afghanistan and W. Pakistan.

In our specimen, pedicels and outside of sepals villose or spreadingly hairy, hairs yellowish and partly glandular. Stamens glabrous. Carpels 5, villose, hairs yellowish usually eglandular. Flowers at least partly purplish.

Adonis aestivalis L., Sp. Pl. ed. 2. 771 (1762).

ssp. parviflorus (Fisch. ex DC.) N. Busch, Fl. Cauc. Crit. III, 3: 201 (1903).-H. Riedl in Ann. Naturh. Mus. Wien LXVI: 62 (1963).

A. parviflorus Fisch. ex DC., Prodr. I: 24 (1824).

A. aestivalis (non L.) Tamura in K. F. A. 119, cum syn.

A. scrobiculata Boiss., Diagn. Ser. 2, I: 6 (1853).-Tamura in K. F. A. 119, cum syn.-Gilli in Rep. Sp. Nov. LXIX: 156 (1964).

Distr. East Caucasus, Iraq, Transcaspia, Iran, Afghanistan and W. Pakistan.

Anemone obtusiloba D. Don, Prodr. Fl. Nep. 194 (1825).-Gilli in Rep. Sp. Nov. LXIX: 156 (1964).

Distr. Afghanistan, W. Pakistan, Himalayas: from Kashmir to Bhutan, Upper Burma, Central Asia: Tianshan, and probably Tibet.

Anemone Tschernaewi Regel in Act. Hort. Petrop. VIII: 690 (1884).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 156 (1964).

Distr. Pam.-Al. and Afghanistan.

Batrachium divaricatum (Schrank) Schur, En. Pl. Trans. 12 (1866).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 156 (1964).

Ranunculus divaricatus Schrank, Baier. Fl. II: 104 (1789).

Distr. Europe, Caucasus, Siberia, Central Asia, and Afghanistan.

Batrachium trichophyllum (Chaix) v. d. Bossche.-K. F. A. 122.

Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 355).

Caltha palustris L.

var. **alba** (Jacq. ex Camb.) Hook. f. et Thoms., Fl., Brit. Ind. I: 21 (1872).

Distr. Afghanistan.

f. **silvatica** Gilli in Fedde, Rep. Sp. Nov. LXIX: 158 (1964), nom. illeg.

Distr. Afghanistan.

f. **alpina** Gilli, l. c. 158 (1964).

This plant is not the same with C. palustris var. alpina Schur.

var. himalaica Tamura in Act. Phytotax. Geobot. XIX: 76 (1962).

C. palustris var. *alpina* (non Schur) Tamura.-K. F. A. 122.

Distr. Afghanistan and Himalayas (from Kashmir to Bhutan).

The style of follicle in Afghan plants is considerably long (about 2mm).

Accordingly they may be included in this Himalayan race of the polymorphous species.

Clematis chrysantha Ulbr. in Fedde, Rep. Sp. Nov. Beih. XII: 374 (1922).

var. **paucidentata** Tamura var. nov.

Surculi hornotinorum basi perulati. Folia remote 2-3-jugo-pinnata 10-17cm longa, pinnis lateralibus 3-fidis vel-partitis infimis saepe ternatis, cum petiolulo 5-15mm longo 18-35mm longis, parte vel segmento medio lateralibus duplo longiore oblongo-lanceolato superne attenuato obtuso apiculato inferne utrinque 1-2 dentato vel integro. Flores terminales et axillares 4.5-5cm diam., pedicello 8-12cm longo, sepalis ovato-lanceolatis 25-28mm longis 8-9mm latis extus margine albo-tomentosis, cetera subglabratis intus albo-pubescentibus.

Mt. Noshaq, Qasideh Valley, Wakhan, 3040m (Jul. 17-20, 1960 R. Y. no. 488 Typus in KYO).

Distr. Afghanistan.

C. chrysantha is closely related to C. orientalis and C. tangutica, but differs from the former by producing a terminal flower and few flowered inflorescence, and from the latter by sepals pubescent inside. This variety is distinguished from var. chrysantha by scantily dentate leaflets.

Clematis orientalis L.-K. F. A. 123.

Ishkashim, Wakhan (Aug. 25-26, 1960 R. Y. no. 800), Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 239).

var. **monantha** Tamura var. nov.

Folia remote 2-3-jugo-pinnata subcoriacea, pinnis lateralibus 3-fidis vel-partitis, infimis saepe ternatis, cum petiolulo 5-15mm longo 15-30mm longis, partibus vel foliolis ovatis vel ovato-lanceolatis parce incisis vel inciso-serratis. Flores axillares solitarii raro 3, sepalis elliptico-vel oblongo-lanceolatis acuminatis subpersistentibus 15-20mm longis extus margine albo-tomentosis intus albo-subvillosis.

Ishkashim, Wakhan (Aug. 25-26, 1960 R. Y. no. 801 Typus in KYO, no. 814).

Distr. Afghanistan.

This variety is characterized by usually 1-flowered cymes and often persistent sepals in fruiting time. The bracteoles are situated at the lower part of the pedicel which is 3.5-7cm long and distinctly shorter than the leaves.

Delphinium Brunonianum Royle.-K. F. A. 124.

Mt. Noshaq, Qasideh Valley, Wakhan, 3800-4000m (Aug. 4, 1960 R. Y. nos. 558, 647).

Halerpestes sarmentosa (Adams) Komar. in Komar. et Klob.-Alis. Key Pl. Fareast. Reg. USSR. I: 550 (1931).

Ranunculus sarmentosus Adams in Mém. Nat. Mosc. III: 244 (1834).

Halerpestes salsuginosa (Pall.) Greene in Pittonia IV: 208 (1900).-Gilli in Rep. Sp. Nov. LXIX: 157 (1964).

Ranunculus salsuginosus (non Georgi) Pall., Reise III: 213, 265 (1776).

Mt. Noshaq, Qasideh Village (Jul. 16-17, 1960 R. Y. no. 392).

Distr. Central Asia, Afghanistan, W. Pakistan, Siberia, Mongolia, North China, Manchuria and North Korea.

Oxygraphis subintegra H. Riedl in Ann. Naturh. Mus. Wien LXV: 31, Taf. I-1 (1962).

Distr. Afghanistan.

Ranunculus arvensis L.-K. F. A. 130.

Between Kabul and Pagman (Jun. 17, 1960 R. Y. no. 28).

Ranunculus baldshuanicus Regel ex Komar. in Trav. Soc. Nat. Pét. XXVI: 67 (1896).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 157 (1964).

Distr. Central Asia: Syr-Dar., Pam.-Al., Tianshan and Afghanistan.

Ranunculus hirtellus Royle var. leiocarpus Tamura.-K. F. A. 130.

Mt. Noshaq, Qasideh Valley, Wakhan, 3800-4000m (Aug. 4, 1960 R. Y. nos. 636, 645).

Ranunculus laetus Wall.-K. F. A. 130.

Borak, Badakhshan (Jul. 12-13, 1960 R. Y. nos. 37, 244), (Sept. 4, 1960 R. Y. no. 994), (Sept. 12, 1960 R. Y. no. 266), Between Faizabad and Borak, Badakhshan (Jul. 7-8, 1960 R. Y. nos. 301, 315).

Ranunculus muricatus L.-K. F. A. 131. var. **muricatus**.

Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 253).

Distr. var. muricatus. Europe, Mediterranean Region, Asia minor, Caucasus, Iran, Afghanistan, Central Asia, Himalayas (Punjab), and North America.

Ranunculus orientalis L., Sp. Pl. 781 (1753).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 156 (1964).

Distr. Mediterranean Region, Asia minor, Iran, and Afghanistan.

Ranunculus paucidentatus Schrenk in Bull. Phys.-Math. Acad. Pét. III: 309 (1845).

var. **pusillus** Gilli, l. c. 157 (1964).

Distr. Afghanistan.

Ranunculus rubrocalyx Regel ex Komar. in Trans. Soc. Nat. Pét. XXVI: 62 (1896).

f. **microflorus** Gilli, l. c. 157 (1964).

Distr. Afghanistan.

Ranunculus rufosepalus Franch. in Mis. Capus Pl. d. Turk. 6 (1883).-Gilli, l. c. (1964).

Distr. Central Asia: Pamiro-Alai, Tianshan, and Afghanistan.

Ranunculus sceleratus L., Sp. Pl. 551 (1753).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 157 (1964).

Distr. Europe, North Africa, Asia minor, Caucasus. Central Asia, Iran, Afghanistan, India, Mongolia, China, Japan and North America.

Ranunculus shaftoanus (Ait. et Hemsl.) Boiss. Fl. Or. Suppl. 5 (1888).-Gilli, l.

c. 157 (1964).

Oxygraphis shaftoanus Ait. et Hemsl. in Jour. Linn. Soc. XIX : 149 (1882).

Distr. Afghanistan and Pamiro-Alai.

Thalictrum afghanicum Gilli in Fedde, Rep. Sp. Nov. LVII : 96 (1955).

Distr. Afghanistan.

Thalictrum minus L. var. majus (Jacq.) Hook. f. et Thoms.-K. F. A. 131.

Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 253).

Thalictrum sultanabadense Stapf in Verh. Zool.-Bot. Ges. Wien XXXVIII : 550 (1888).-Gilli in Fedde, Rep. Sp. Nov. LXIX : 158 (1964).

Distr. Iran and Afghanistan.

Trollius afghanicus Hedge et Wendelbo in Act. Univ. Bergen. Ser. Math. Rerum. Natur. XVIII : 28, Fig. 21 et 22 (1963).

Distr. Afghanistan.

Berberidaceae

Berberis calliobotrys Aitch. ex Schneider.-K. F. A. 132.

Berberis cretica auct. non L., Aitchison in Journ. Linn. Soc. XVIII : 31.-K. F. A. 132.

Distr. W. Pakistan (Kuram, Swat).

Berberis integerrima Bunge, Index Sem. Hort. Acad. Dorpat, 1843 : 6.-Fedtchenko in Fl. URSS VII : 558, Tab. XXXVII, Fig. 2. (1937).

var. **densiflora** (Boiss. et Buhse) Schneider in Bull. Herb. Boiss. Sér. 2, V : 461 (1905).-Gilli in Fedde, Rep. Sp. Nov. LXIX : 159 (1964).

Berberis turcomanica var. *densiflora* Schneider in New Fl. & Silva I : 133 (1929).

Distr. sp. Iran, Afghanistan, Dz.-Tarb., Tianshan, Pam.-Al. and Dz.-Kashg.

Berberis nummularia Bunge var. **pyrocarpa** (Regel) Schneider, Ill. Hand. Laubh. I : 307 (1905), in Bull. Herb. Boiss. 2 Série V : 460 (1905).-Gilli in Fedde, Rep. Sp. Nov. LXIX : 159 (1964).

Berberis integerrima var. *β. pyrocarpa* Regel in Acta Horti Petrop. V : 228 (1877).

Borak, Badakhshan (Aug. 12, 1960 R. Y. nos. 339, 340)-fr., (July 12-13, 1960 R. Y. no. 217)-fr.

Papaveraceae

Corydalis diphylla Wall., Tent. Fl. Nep. 54 (1824-26).-Kitamura, Fl. Pl. W. Pakistan 68 (1964).

Corydalis Griffithii Boiss.-K. F. A. 133.

Distr. From East Afghanistan to Kumaon.

Corydalis Gortschakovii Schrenk, Enum. Pl. Nov. I : 100 (1841).-Kitamura, Fl. Pl. W. Pakistan 68 (1964).

Corydalis Moocroftiana Wall.-K. F. A. 133.

Distr. Dz.-Trab., Tianshan, Pam.-Al., Afghanistan, W. Pakistan and Kashmir.

Fumaria Vaillantii Loisl. in Desvaux Journ. Bot. II: 358 (1809).-Popov in Fl. URSS VII: 715, Tab. XLV, Fig. 9 (1937).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 160.

Distr. Europe, North Africa, Asia minor, Arm.-Kurd., Caucasus, Central Asia, Iran and Afghanistan.

Glaucium corniculatum Curt., Fl. Lond. II, VI tab. 32 (1798).-Popov, l. c. 588, Tab. XL, Fig. 3 (1937).

var. **flaviflorum** DC., Syst. II: 97 (1821).-Boiss., Fl. Or. I: 120.-Gilli, l. c. 160 (1964).

Distr. sp. Europe, North Africa, Asia minor, Caucasus, Arm.-Kurd., Central Asia, Iran and Afghanistan.

Hypecoum parviflorum Kar. et Kir. in Bull Soc. Nat. Mos. XV: 141 (1842).-Fedde in Pflanzenreich Heft 40: 96 (1909).-Popov in Fl. URSS VII: 580, Tab. XLV, Fig. 2, a, b (1937).

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. nos. 419, 420).

Distr. Alt., Central Asia, Iran, Afghanistan and Dz.-Kashg.

Hypecoum trilobum Trautv. in Acta Horti Petrop. IX: 366 (1844), IX, 2: 438 (1886).-Popov, l. c. 580, Tab. XLV, Fig. l, a-b (1937).-Gilli, l. c. 160 (1964).

Distr. Iran, Afghanistan and Central Asia.

Capparidaceae

Capparis spinosa L.-K. F. A. 137.

Between Faizabad and Borak (July 7-8, 1960 R. Y. nos. 95, 97).

Cruciferae

Allyssum alyssoides (L.) L., Amoen. Acad. IV : 487 (1759).-Dudley in Journ. Arnold Arb. XLVI: 197 (1965).

Distr. Europe, North Africa, Asia minor, Caucasus and Afghanistan.

Allyssum heterotrichum Boiss., Diag. Ser. I, VI: 15 (1845), Fl. Or. I: 287 (1867).-Dudley, l. c. 195 (1965).

Distr. Iran, Afghanistan and Kazakstan.

Allyssum linifolium var. **teheranicum** Bornm. in Bull. Herb. Boiss. II Sér, IV: 1269 (1904).-Dudley, l. c. 188 (1965).

Distr. var. Asia minor, Syria, Iraq, Iran, Caucasus, Afghanistan and W. Pakistan.

Allyssum meniocoides Boiss. in Ann. Sci. Nat. Paris Sér II, XVII: 158 (1842), Fl. Orient. I: 286 (1867).-Dudley, l. c. 189.

Distr. Syria, Lebanon, Palestine, Iraq, Iran, and Afghanistan.

Allyssum Szovitsianum Fisch. et Mey. in Ind. Sem. Horti Petrop. IV: 31

(1837).-Busch in Fl. URSS VIII: 355 (1939).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 167 (1964).

Distr. Asia minor, Syria, Caucasus, Iran and Afghanistan.

Arabidopsis Wallichii (Hooker f. et Thoms.) Busch.-K. F. A. 141.

Mt. Noshaq, Qasideh Valley 3200m (Aug. 1, 1960 R. Y. no. 582).

Brassica Napus L., Sp. Pl. 666 (1753).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 174 (1964).

Distr. A cultivated plant.

Brassica Rapa L.-K. F. A. 143.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 401)-fl. and fr.

Buchingera axillaris Boiss., Diag. Pl. Or. Nov. Ser. I, VIII: 29 (1849), Fl. Or. I: 305.-Busch in Fl. URSS VIII: 368 (1939).-Gilli, l. c. 170 (1964).

Distr. Caucasus, Central Asia, Iran, and Afghanistan (in garden).

Camellina hispida Boiss. in Ann. Sc. Nat. Sér. II, XVII: 176 (1842), Fl. Orient. I: 312 (1867).-Gilli, l. c. 170 (1964).

Distr. Syria, Armenia, Iraq, Iran, and Afghanistan.

Capsella Bursa-pastoris Medic.-K. F. A. 144.

Ishkashim (Aug. 25-26, 1960 R. Y. no. 828).

Chorispora sabulosa Camb.-K. F. A. 144.

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1076).

Christolea afghanica Rech. f.-K. F. A. 144.

C. crassifolia (non Camb.) N. Busch in Fl. URSS VIII, Tab. XV-3.

Mt. Noshaq, Qasideh Valley, 3200m (Aug. 1, 1960 R. Y. no. 580), 3040m (Aug. 26, 1960 R. Y. no. 526).

Jafri united C. pamirica and C. afghanica with C. crassifolia in Notes Bot. Gard. Edinb. XX: 51.

C. crassifolia is densely pilose and has narrow pods.

The present author distinguishes C. afghanica from C. crassifolia as a geographically differenciated group.

Conringia planisiliqua Fischer.-K. F. A. 145.

Mt. Noshaq, Qasideh Valley 3040m (July 17-20, 1960 R. Y. no. 424).

Descurainia Sophia (L.) Webb. ex Prantl.-K. F. A. 146.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 320).

Draba Korshinskyi (O. Fedsch.) Pohle.-K. F. A. 147.

Mt. Noshaq, Qasideh Valley 4000m (Aug. 4, 1960 R. Y. no. 639), 3800-4000m (Aug. 4, 1960 R. Y. no. 1008).

Draba oreades Schrenk in Fischer et Mey., Enum. Pl. Nov. II: 56 (1842).-Tolmatschev in Fl. URSS VIII: 393, Tab. XXIV, Fig. 2 (1939).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 168 (1964).-Kitamura, Fl. Pl. W. Pakistan 73 (1964).

Distr. Central Asia, Afghanistan, Karakoram, Himalayas, and China.

Draba tibetica Hooker f. et Thomson var. **turkestanica** (Regel et Schmalh.)

O. E. Schulz in Pflanzenreich Heft. 89: 300 (1927).-Gilli, l. c. 169 (1964).

Distr. var. Pam.-Al., Tianshan and Afghanistan.

Ermania linearis (N. Busch) Botsch in Not. Syst. Kom. XVII: 166 (1956).

Ermania himalaiensis auct., non O. E. Schulz.-Kitam., Fl. Pl. W. Pakistan quoad syn. *Christolea linearis* N. Busch et specim. ex Wakhan.

Mt. Noshaq, Qasideh Valley 4000-4500m (Aug. 10-15, 1960 R. Y. no. 676).

Distr. Pam.-Al. and Afghanistan (Wakhan).

E. himalaiensis (Camb.) O. E. Schulz has broader pods, and is distributed from Karakoram, Kashmir to Nepal (Tsarka 4700m K. Nishioka no. 76, near Musumna 5100m K. Nishioka no. 250).

Erophila praecox (Stev.) DC., Syst. II: 357 (1821).-Busch in Fl. URSS VIII: 455 (1939).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 170 (1964). Reich., Ic. XII f. 4233.

Distr. Europe, Caucasus, Central Asia, Asia minor, Arm.-Kurd., Iran and Afghanistan.

var. **virescens** (Jord.) O. E. Schulz in Pflanzenreich Heft 89: 368 (1927).-Gilli, l. c. (1964).

Erophila verna (L.) E. Meyer var. **cabillonensis** (Jord.) O. E. Schulz in Pflanzenreich Heft 89: 352 (1927).-Gilli, l. c. (1964).

Isatis tinctoria L.-K. F. A. 153.

Gilli published Isatis Koelzii Rech. f. var. trichocarpa Gilli in Fedde, Rep. Sp. Nov. LXIX: 173 (1964).

Lepidium latifolium L.-K. F. A. 154.

Mt. Noshaq, Qasideh Valley 3040m (July 17-20, 1960 R. Y. nos. 462, 458, 463).

Lepidium sativum L.-K. F. A. 155.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 770, 771, 940, 769).

Malcolmia strigosa Boiss.-K. F. A. 156.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 4).

Nasturtium officinale R. Br.-K. F. A. 158.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 43, 46).

Parrya nudicaulis (L.) Regel subsp. turkestanica (Korsh.) Hultén, Fl. Alaska and Yukon V: 892 (1945).

Parrya nudicaulis auct.-K. F. A. 159.

Parrya turkestanica (Korsh.) N. Busch in Fl. URSS VIII: 259 (1939).

Parrya macrocarpa var. *turkestanica* Korsh., Frag. Fl. Turk. 407 (1898).

Mt. Noshaq, Qasideh Valley 4000m (Aug. 4, 1960 nos. 626, 713, 730).

Distr. subsp. Afghanistan (Wakhan), Pam.-Al., Tianshan, Dz.-Tarb., Ang.-Sayan., and Dauria.

Parrya stenocarpa Kar. et Kir. var. minjanensis (Rech. f.) Kitamura, Fl. Pl. W. Pakistan 76 (1964).

Parrya minjanensis Rech. f.-K. F. A. 159.

Phaeonychium parryoides (Kurz) O. E. Schulz in Notiz. Bot. Gart. Mus. Berl. -Dahlem IX: 1092 (1927).-Kitamura, Fl. Pl. W. Pakistan 76, Fig. 19 (1964).

Mt. Noshaq, Qasideh Valley, 3800-4000m (Aug. 4, 1960 R. Y. no. 1006).

Distr. Northwest Himalaya and Afghanistan (Wakhan).

Roripa islandica (Oeder) Boras.-K. F. A. 159.

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. no. 1062), Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1027).

Sisymbrium altissimum L.-K. F. A. 160.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 792, 796), between Faizabad and Borak, Badakhshan (July 7-8, 1960 R. Y. no. 251).

Stroganowia affghana (Boiss.) Pavlov.-K. F. A. 161 errore *afghanica*,

Lepidium affghanum Boiss. errore *affghanicum*.

Torularia humilis (C. A. Mey.) O. E. Schulz.-K. F. A. 165.

Mt. Noshaq, Qasideh Valley, 3800-4000m (Aug. 4, 1960 R. Y. no. 607).

Tauscheria lasiocarpa Fischer in DC., Syst. II: 563 (1821).-Vassil. in Fl. URSS VIII: 228, Tab. XIII, Fig. 12-13 (1939).-Gilli in Fedde, Rep. Sp. Nov. LXIX: 173 (1964).

Distr. Niz.-Bolz., W. Siberia, Central Asia, Afghanistan, Dz.-Kashg. and Mongolia.

Tetracme recurvata Bunge in Arb. naturf. Ver. zu Riga I: 158 (1848).-Boiss., Fl. Or. I: 317.

var. **integrifolia** Gilli, l. c. 170 (1964).

Distr. var. Afghanistan.

Tetracme Stocksii Boiss., Fl. Orient. I: 317 (1867).-Gilli, l. c. 170 (1964).

Distr. W. Pakistan and Afghanistan.

Torularia aculeolata (Boiss.) O. E. Schulz in Engler, Pflanzenreich Heft 86: 223 (1922).-Gilli, l. c. 166 (1964).

Sisymbrium aculeolatum Boiss. in Ann. Sc. Nat. Bot. Sér. II, XVII: 75 (1842).

Distr. Arabia, Iran, Afghanistan and W. Pakistan.

var. **grandiflora** Gilli, l. c. (1964).

Distr. var. Afghanistan.

Torularia torulosa O. E. Schulz var. **scorpiuroides** (Boiss.) O. E. Schulz f. **longipedicellata** Gilli, l. c. 166 (1964).

Winklera silaifolia (Hooker f. et Thomson) Korsh. in Bull. Acad. Pétersb. Sér. V, IX: 419 (1898).-K. F. A. 166.-Gilli in Fedde, Rep. Sp. Nov. LXIX: 67 (1964).

Heldreichia silaifolia Hooker f. et Thomson in Journ. Linn. Soc. V: 176 (1861).

Uranodactylus silaifolius (Hooker f. et Thomson) Gilli in Fedde, Rep. Sp. Nov. LXVI: 194 (1962).

Uranodactylus afghanicus Gilli in Fedde, Rep. Sp. Nov. LXI: 209 (1959).

Lepidium hindukushense Kitamura in Acta Phytotax. Geobot. XIX: 98 (1963), Fl.

Pl. W. Pakistan 75, Fig. 50 (1964).

Distr. Afghanistan and W. Pakistan.

Crassulaceae

Sedum adenotrichum Wall. ex Hooker f. et Thomson.-K. F. A. 167.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 53).

Sedum heterodontum Hooker f. et Thomson.-K. F. A. 167.

Mt. Noshaq, Qasideh Valley 4000m (Aug. 21, 1960 R. Y. nos. 722, 721)-fr., 3040m (July 17-20, 1960 R. Y. no. 484)-fr., Qasideh Village (July 16-17, 1960 R. Y. no. 509)-fr.

Sedum quadrifidum Pall., Reise III, Anh. 730 (1776).-Borissova in Fl. URSS IX: 39.-Kitamura, Fl. Pl. W. Pakistan 78 (1964).

Mt. Noshaq, Qasideh Valley, 3200m (Aug. 1, 1960 R. Y. no. 562)-fr., Nuristan, Shabul Gul (Aug. 6, 1955 S. Kitamura)-fl.

Distr. sp. From Ural to East Siberia and Mongolia, and from East Afghanistan, W. Pakistan and Himalayas to W. China.

Sempervivella acuminata (Decne.) Berger in Engler and Prantl, Nat. Pflanzenfam. ed. 2, XVIII a: 467 (1930).-Kitamura, Fl. Pl. W. Pakistan 78 (1964).

Sempervivella mucronata (Edgew.) Berger var. *glabrum* Kitamura, F. A. 170, Fig. 57, upper.

Mt. Noshaq, Qasideh Valley 4000m (Aug. 21, 1960 R. Y. no. 733), 3200m (Aug. 1, 1960 R. Y. no. 588).

Distr. From East Afghanistan to Kunawar.

Saxifragaceae

Parnassia palustris L.-K. F. A. 171.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 397), Ishkashim (Aug. 25-26, 1960 R. Y. no. 864).

Ribes orientale Desfontaines.-K. F. A. 171.

Mt. Noshq, Qasideh Valley 3040m (July 17-20, 1960 R. Y. no. 427)-fr.

Ribes nigrum L.-K. F. A. 171.

Mt. Noshaq, Qasideh Valley, 3040m (July 17-20, 1960 R. Y. no. 478).

Platanaceae

Platanus orientalis L.-K. F. A. 172.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 49).

Rosaceae

Agrimonia Eupatorium L.-K. F. A. 172.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1012)-an intermediate form between A. Eupatorium and A. pilosa, between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 298).

Crataegus songarica C. Koch.-K. F. A. 173.

Borak, Badakhshan (Aug. 12, 1960 R. Y. nos. 235, 573)-sterile.

Crataegus turkestanica A. Pojark.-K. F. A. 174.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 27)-post anth.

Malus pumila Miller.-K. F. A. 175.

Borak, Badakhshan (July 12, 13, 1960 R. Y. nos. 203, 205, 233)-sterile.

Geum urbanum L.-K. F. A. 174.

Borak (Sept. 4, 1960 R. Y. no. 1014), between Faizabad and Borak (July 7, 8, 1960 R. Y. nos. 295, 297).

Potentilla bifurca L.-K. F. A. 175.

Borak (Sept. 13, 1960 R. Y. no. 1105).

Potentilla desertorum Bunge in Ledeb., Fl. Alt. II: 257.-Juzepczuk in Fl. URSS X: 173.-Kitamura, Fl. Pl. W. Pakistan: 84 (1964).

Mt. Noshaq, Wakhan, 3800-4000m alt. (Aug. 4, 1960 R. Y. nos. 648, 1004).

Distr. Altai, Dz.-Tarb., Tianshan, Pam.-Al., Afghanistan, Mongolia, Karakoram and Himalayas.

Potentilla multifida L.-K. F. A. 176.

Mt. Noshaq, (July 16, 17, 1960 R. Y. nos. 396, 405), Ishkashim (Aug. 29-31, 1960 R. Y. nos. 720, 775), (July 29, 1960 R. Y. nos. 541, 543), (July 17-20, 1960 R. Y. no. 485).

Potentilla reptans L.-K. F. A. 176.

Between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 1183).

Potentilla sericea L.-K. F. A. 176.

Mt. Noshaq 4000m (Aug. 21, 1960 R. Y. nos. 692, 735, 692), 3800-4000m (Aug. 4, 1960 R. Y. nos. 627, 620).

Poterium polygamum Wald. et Kit.-K. F. A. 176.

Borak (July 12, 13, 1960 R. Y. no. 231), between Kabul and Pagman (June 17, 1960 R. Y. no. 15).

Prunus Amygdalus Batsch.-K. F. A. 177.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 19, 54, 55, 56, 57).

Prunus Armeniaca L.-K. F. A. 177.

Borak (July 12, 13, 1960 R. Y. nos. 209, 206)-sterile.

Prunus avium L.-K. F. A. 177.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 26, 52).

Rosa canina L.-K. F. A. 180.

Borak (July 12, 13, 1960 R. Y. nos. 207, 215, 341).

Rosa moschata Herrmann var. Nastarana Christ.-K. F. A. 181.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 17, 47).

Rosa Webbina Royle.-K. F. A. 181.

Borak (Aug. 12, 1960 R. Y. no. 238), Mt. Noshaq (July 16, 17, 1960 R. Y. no.

413), 3040m (July 29, 1960 R. Y. nos. 532, 534, 535).

Rubus caesius L.-K. F. A. 182.

Borak, Badakhshan (Sept. 4, 1960 R. Y. nos. 988, 989, 997)-fr., (Aug. 12, 1960 R. Y. no. 236).-fl.

Leguminosae

Alhagi sparsifolia Shap.-K. F. A. 185.

Between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 63).

Astragalus Subgen. **Calycophysa**

Astragalus (Poterium) jubatus Boiss.-K. F. A. 187.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 3).

Astragalus Subgen. **Cercidothrix**

Astragalus (Xiphidium) subuliformis DC., Astrag. 134 (1802).-Ali in Kew Bull. 1958-59: 316.

Astragalus subulatus Bieb. (non Desf. 1799).-K. F. A. 191.

Astragalus (Ammodendron) squarrosus Bunge.-K. F. A. 188.

var. **sangonensis** (Sirjaev et Rech. f.) Ali in Kew Bull. 1958-59: 316.

Distr. var. Iran, Afghanistan and Transcaspia.

Astragalus Subgen. **Hypoglottis**.

Astragalus (Hypoglottis) **hasarorum** Gilli in Fedde, Rep. Sp. Nov. LXIII: 321, Abb. 1 (1961).

Distr. Afghanistan.

Astragalus (Hypoglottis) tibetanus Benth.-K. F. A. 193.

Mt. Noshaq, Qasideh Village, Wakhan (July 16-17, 1960 R. Y. nos. 406, 422 p. p.), 3040m (July 26, 1960 R. Y. nos. 519, 524), 3040m (July 17-20, 1960 R. Y. no. 667).

Astragalus Subgen. **Phaca.**

Astragalus (Aegacantha) lasioseminus Boiss.-K. F. A. 200.

Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. no. 410).

Astragalus (Aegacantha) **minuto-foliolatus** Wendelbo in Nytt Mag. Bot. I: 43, fig. 16 (1952).

Mt. Noshaq, Qasideh Valley 3800-4000m (Aug. 4. 1960 R. Y. no. 619).

Distr. W. Pakistan and Wakhan.

Astragalus (Aegacantha) **pseudo-psilacanthus** Ali in Kew Bull. 1958-59: 313.

Distr. W. Pakistan (Kurram Valley).

Astragalus (Brachycarpus) **melanostachys** Benth. ex Bunge, Monogr. Astragali I: 211 (1868), II: 22.-Boriss. in Fl. URSS XII: 54.-Kitamura, Fl. Pl. W. Pakistan 89 (1964).

Mt. Noshaq, Qasideh Valley 3800-4000m (Aug. 4, 1960 R. Y. nos. 625, 646, 622), 4000m (Aug. 21, 1960 R. Y. no. 686), 3200m (Aug. 1, 1960 R. Y. no. 550).

Distr. Pam.-Al., Afghanistan (Wakhan), and Himalayas.

Astragalus (Diplotheca) nigritus Sirj. et Rech. f.-K. F. A. 211.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 16).

Astragalus (Erionotus) chamaerionotus Rech. f.-K. F. A. 211.

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1112).

The type seems to be a depauperate plant.

Stem suffruticose procumbent to 15cm long.

Our specimens differ from the type by the longer calyx (8mm long, not ± 6mm long).

Astragalus (Myobroma) **adpresse-pilosus** N. Goncharow in Notulae Syst. Herb. Kom. IX : 128 (1946), Fl. URSS XII : 230 (1946).-Kitamura, Fl. Pl. W. Pakistan 88 (1964).

Mt. Noshaq, Qasideh Valley 4000m (Aug. 21, 1960 R. Y. no. 717)-post anth.

Distr. Tianshan, Pam.-Al., Afghanistan (Wakhan), and W. Pakistan.

Astragalus (Myobroma) barbicalyx Ali in Kew Bull. 1958-59 : 308.

Astragalus kurrumensis Bunge in Acta Horti Petrop. VII : 370 (Aug. 1880) non Baker (1880).-K. F. A. 216.

Astragalus (Myobroma) charguschanus Freyn.-K. F. A. 215.

Mt. Noshaq, Qasideh Valley, 4000m (Aug. 4, 1960 R. Y. no. 637), 3200m (Aug. 1, 1960 R. Y. no. 553).

Astragalus (Myobroma) subconduplicatus Ali in Kew Bull. 1958-59 : 315.

Astragalus Aitchisonii Sirjaev & Rech. f. (non Baker 1876).-K. F. A. 215.

Astragalus (Schremetevianae) Schremetevianus B. Fedtsch.-K. F. A. 217.

Mt. Noshaq, Qasideh Valley 3040m (July 26, 1960 R. Y. nos. 505, 506, 515).

Astragalus Subgen. **Tragacantha**

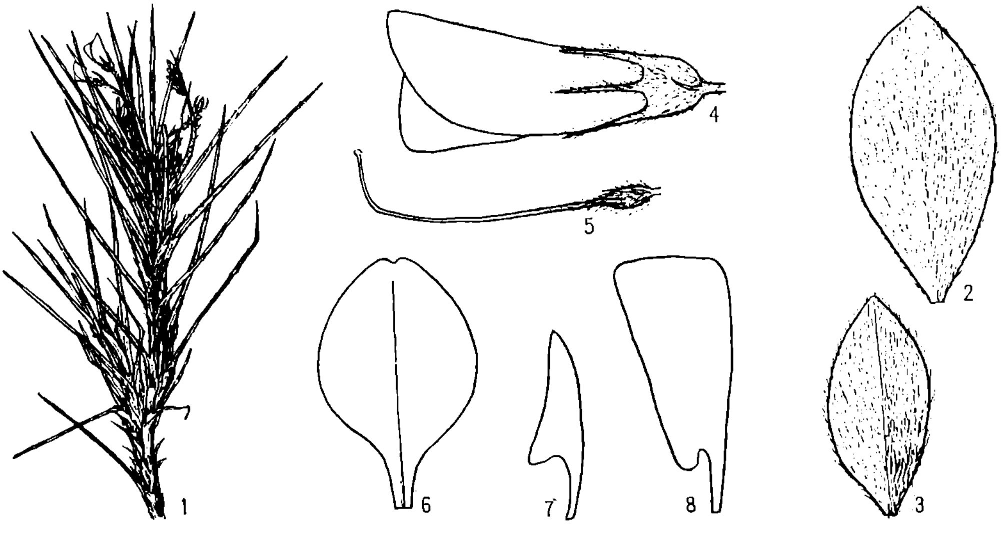

Fig. 1 Astragalus Yosiianus Kitamura 1 Flowering branch 2, 3 Leaflets 4 Flower 5 Pistil 6 Standard 7 Wing 8 Keel (Wakhan : Ishkashim).

Astragalus (Macrothrix) glabrifolius Bunge.-K. F. A. 218.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 10).

Astragalus (Oliganthos) **Yosiianus** Kitamura sp. nov. **Fig. 1.**

Suffrutex caespitosus lignescens, validus, 6-9cm altus, ramis sulcatis 3-4mm diametro pilis albis basifixis patentibus pilosis. Folia copiosa rigida paripinnata spinosa 4.5-5cm longa medio 1 mm diametro, foliola 3-5 juga, oblonga 4.5-11mm longa apice obtusa mucronulata in sicco saepe involuta, supra resinoso-punctata et sparse pilosa subtus pilis albis basifixis dense vestita, stipulis lanceolato-linearibus 8mm longis infra medium petiolo adonatis, fusco-membranaceis albo-pilosis apice acuminatis. Racemi axillares 3-3.5 cm longi post anthesin persistentes rigidi, sub anthesi graciles pilis albis basifixis patentibus dense vestiti, plerumque 3-flori, bracteis lanceolatis 3 mm longis fuscis persistentibus. Pedicelli 1-2 mm longi, apice bibracteolati, bracteolis vix 1 mm longis. Flores purpurei. Calyx dense albo-pilosus tubuloso-campanulatus, 5.5-6 mm longus, 5-fidus, lobis lanceolato-linearibus, subaequilongis, 3 mm longis. Vexillum ovatum apice emarginatum basi breviter unguiculatum, 8-10 mm longum 6 mm latum, dorso glabrum. Alae oblique oblongae 7 mm longae basi breviter unguiculatae. Carina 9.5-9mm longa basi breviter unguicalata. Stylus glaber. Ovarium sessile dense albo-pilosum, uni-ovulatum.

Distr. Afghanistan, Wakhan, Ishkashim (Aug. 29-31, 1960 R. Y. no. 923 Typus, in Herb. Univ. Kyoto., no. 930).

This species stands between Subgen. Phaca Sect. Acanthophace and Subgen. Tragacantha Sect. Oliganthos.

The flowers are not sessile, but shortly pedicellate.

The ovary contains one ovule.

The present author placed this species in Sect. Oliganthos by the one ovuled ovary.

Astragalus Subgen. **Trimeniaeus**

Astragalus (Falcinellus) subumbellatus Klotzsch, Bot. Ergebn. Waldem. 159, t. 3 (1862).-Ali in Kew Bull. 1958-59: 305.

Astragalus hippocrepides Benth. ex Bunge (1868).-K. F. A. 219.

Astragalus (Oxyglottis) ammophilus Karelin et Kirilow var. **persipolitanus** (Boiss.) Ali in Kew Bull. 1958-59: 306. A. *persipolitanus* Boiss.

Chesneya acaulis (Baker) Popov in Bull. Univ. As. Centr. Livr. 15, suppl. (Sched. Herb. Fl. As. Med. Fasc. 11-13) 10 (1927) in obs. Caragana acaulis.

Chesneya acaulis (Baker) K. F. A. 223.

Cercis Griffithii Boiss.-K. F. A. 223.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 40)-fr., Istalif (June 25, 1960 R. Y. no. 82).

Cicer Fedtschenkoi Lincz. in Not. Syst. Kom. XI: 108 (1949), Fl. URSS XIII: 399, Tab. XXI, Fig. 5.

Mt. Noshaq, Qasideh Valley 3040m (July 17-20, 1960 R. Y. no. 441).

Distr. Pam.-Al. and Afghanistan (Wakhan).

Cicer pungens Boiss.-K. F. A. 225.

Mt. Noshaq, Qasideh Valley 3040 m (Aug. 17-20, 1960 R. Y. no. 443), 3200 m (Aug. 1, 1960 R. Y. no. 578), 4000-3800m (Aug. 4, 1960 R. Y. no. 621), 3040 m (July 26, 1960 R. Y. nos. 511, 517).

Glycyrrhiza glabra L. var. glandulifera Regel et Herder.-K. F. A. 229.

Borak, Badakhshan (July 12, 13, 1960 R. Y. nos. 223, 247, 208)-fr., between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 90)-fr.

Glycyrrhiza uralensis Fischer.-K. F. A. 229.

Ishkashim (July 16, 1960 R. Y. no. 372)-fl.

Lagonychium farctum (Banks et Sol.) Bobr.-K. F. A. 234.

Kunduz (Sept. 17, 1960 R. Y. 1155)-fr.

Lathyrus pratensis L.-K. F. A. 235.

Borak, Badakshan (July 12, 13, 1960 R. Y. no. 275).

Lathyrus sativus L.-K. F. A. 235.

Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. nos. 379, 380), Ishkashim (Aug. 25-26, 1960 R. Y. no. 845).

Lotus corniculatus L. var. japonicus Regel.-K. F. A. 236.

Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. nos. 496, 1177)-fr., Borak, Badakhshan (July 12, 13, 1960 R. Y. no. 226)-fr.

Medicago lupulina L.-K. F. A. 236.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 906, 785), (Aug. 25-26, 1960 R. Y. nos. 809, 869), Borak Badakhshan (July 13, 1960 R. Y. nos. 86, 243), Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. no. 533).

Medicago sativa L.-K. F. A. 237.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 780, 783, 818), Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. no. 1178).

Melilotus albus Medikus var. parviflorus Boiss.-K. F. A. 237.

Borak, Badakhshan (July 13, 1960 R. Y. no. 85), (Sept. 4, 1960 R. Y. no. 991).

Melilotus officinalis Medikus var. micranthus Schulz.-K. F. A. 238.

Qasideh Village, Wakhan (Aug. 24, 1960 R. Y. no. 748), (July 16, 17, 1960 R. Y. no. 421), Borak, Badakhshan (July 12, 13, 1960 R. Y. no. 579).

Ononis spinosa L. subsp. afghanica (Sirj. et Rech. f.) Kitamura, F. A. 240.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1017).

Oxytropis crassiuscula Boriss. in Notulae System. Komarov VII : 237 (1937).-Vassil. et B. Fedtschenko in Fl. URSS XIII : 163.

Mt. Noshaq, Qasideh Valley 4000 m (Aug. 21, 1960 R. Y. nos. 720, 687)-fr., 3800-4000m (Aug. 4, 1960 R. Y. nos. 660, 652)-fl.

Distr. Pam.-Al. and Afghanistan (Wakhan).

Oxytropis Gorbunovii Boriss. in Trav. Tadz. Bazui Ak. Nauk SSSR II : 168

(1936).-B. A. Fedtschenko, Fl. Tadz. V: 528.-Vassil. et B. Fedtschenko in Fl. URSS XIII: 49.

Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. no. 422), Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 366).

Distr. Pam.-Al. and Afghanistan.

Oxytropis platonychia Bunge, Spec. Oxytrop. 44 (1874).-B. A. Fedtschenko, Fl. Tadz. V: 533.-Vassil. et B. Fedtschenko in Fl. URSS XIII: 163, Tab. VIII, fig. 3 (1948).

Mt. Noshaq, Qasideh Valley 3800-4000 m alt. (Aug. 4, 1960 R. Y. nos. 661, 650).

Distr. Pam.-Al., Tianshan and Afghanistan (Wakhan).

Pisum sativum L. var. arvense Poiret.-K. F. A. 241.

Qasideh Village (Wakhan), (Aug. 24, 1960 R. Y. no. 750).

Robinia Pseudoacacia L.-K. F. A. 241.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 50).

Trifolium fragiferum L.-K. F. A. 241.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 5, 1166).

Trifolium pratense L.-K. F. A. 242.

Borak, Badakhshan (July 13, 1960 R. Y. nos. 286, 296).

Trigonella afghanica Vass.-K. F. A. 242.

T. gracilis errore det. non Benth.-K. F. A. 243.

Borak, Badakhshan (Sept. 12, 1960 R. Y. nos. 1132, 1146), Nuristan, between Kushimaicot and Pushki (Aug. 3, 1955 S. Kitamura).

Trigonella gracilis is not yet found in Afghanistan.

Trigonella Emodi Benth.-K. F. A. 242 excl. syn. T. cachemiriana Camb.

Distr. From Afghanistan, W. Pakistan and Kashmir to Nepal.

T. cashemiriana is not yet found in Afghanistan.

Trigonella incisa Benth.-K. F. A. 243.

Borak, Badakhshan (July 7, 1960 R. Y. no. 329).

Trigonella iskanderi Vass. in Not. Syst. Kom. XI: 103 (1949), in Fl. et Syst. X: 152, fig. 7 (1953).

Mt. Noshaq, Qasideh Valley 3200 m (Aug. 1, 1960 R. Y. no. 590).

Distr. Pam.-Al. and Afghanistan (Wakhan).

Vicia Ervilla (L.) Willd.-K. F. A. 244.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 957, 958)-fr.

Vicia sativa L.-K. F. A. 245.

Qasideh Village, Wakhan (Aug. 24, 1960 R. Y. no. 743)-fr.

Vicia villosa Roth.-K. F. A. 246.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 984)-fl., (July 12-13, 1960 R. Y. nos. 246, 248).

Geraniaceae

Geranium exul Rech. f. et H. Riedl in Ann. Naturh. Mus. Wien LXV: 32, Taf. 1-2 (1962).

Distr. Afghanistan (Shewa Lake).

Geranium rotundifolium L., Sp. Pl. 683 (1753).-Bobrov in Fl. URSS XIV: 56 (1949).-Wendelbo in Acta Hort. Univ. Berg. Series Math.-Naturv. 1963 no. 18: 53 (1964).

Distr. Europe, Caucasus, Central Asia, Iran, Afghanistan and Ussuri.

Linaceae

Linum corymbulosum Rechb.-K. F. A. 248.

Ishkashim (July 16, 1960 R. Y. no. 267), Borak, Badakhshan (Aug. 12-13, 1960 R. Y. no. 448).

Distr. From Europe to W. Pakistan, Karakoram, Skardu, around air port (Aug. 5, 1955 S. Nakao).

Linum usitatissimum L.-K. F. A. 249.

Ishkashim (Aug. 25-26, 1960 R. Y. 853).

Zygophyllaceae

Peganum Halmala L.-K. F. A. 249.

Between Faizabad and Borak (July 7-8, 1960 R. Y. nos. 99, 98, 1189, 88).

Zygophyllum Fabago L. var. oxianum Kitamura, F. A. 250.

Istalif (June 25, 1960 R. Y. no. 69).

Euphorbiaceae

Andrachne asperula Nevski in Acta Inst. Bot. Acad. Sci. URSS Ser. I, IV: 263 (1937).-Rechinger f., l. c. 5 (1964).

Distr. Afghanistan, Uzbekistan.

Andrachne pusilla Pojark., Fl. URSS XIV: 278, 733 (1949).-Rechinger f., l. c. 5 (1964).

Distr. Pam.-Al. and Afghanistan.

Andrachne telphioides L., Sp. Pl. 1014 (1753).-Rechinger f., Fl. Iran. Euph. 2 (1964).

Distr. Mediterranean Region, Asia minor, Iran, Afghanistan, and W. Pakistan.

Euphorbia Aucheri Boiss., Diag. Pl. Or. Ser. I, VII: 94 (1846).-Rech. f., l. c. 34 (1964).

Distr. Iraq, Iran. Afghanistan and W. Pakistan.

Euphorbia Boissieriana (Woron.) Prokh. in Fl. URSS XIV: 445 (1949).-Rech. f., l. c. 42 (1964).

Distr. Asia minor, Caucasus, Iran, Afghanistan, Turcomania, Kara-Kum., and W. Pakistan.

Euphorbia Bungei Boiss. in DC., Prodr. XV, 2: 115 (1862).-Rech. f., l. c. 26

(1964).

Distr. Anatolia, Caucasus, Iran and Afghanistan.

Euphorbia canescens L., Sp. Pl. ed. 2 : 652 (1762).-Prokhanov in Fl. URSS XIV : 491, Tab. XXV-1 (1949).

Between Borak and Faizabad (Sept. 15, 1960 R. Y. no. 1306), Borak (Sept. 4, 1960 R. Y. no. 973).

Distr. Mediterranean Reg., Asia minor, Caucasus, Tianshan, Syr-Dah., Pam.-Al., Gorn.-Turkm. and Afghanistan.

Euphorbia cheirolepis Fischer et Mey. ex Ledeb., Fl. Ross. III : 558 (1850).-Rech. f., l. c. 18 (1964).

Distr. Aral.-Casp., Pam.-Al., Kara-Kum., Turcomania, Iran, Afghanistan, W. Pakistan.

Euphorbia cognata (Klotzsch et Garcke) Boiss. in DC., Prodr. XV, 2 : 120 (1866).-Rech. f., l. c. 29 (1964).

Distr. Afghanistan, W. Pakistan, and Himalayas.

Euphorbia consanguinea Schrenk in Fisch. et Mey., Enum. Pl. Nov. I : 88 (1841).-Rech. f., l. c. 21 (1964).

Distr. Songaria and Afghanistan.

Euphorbia cyrtophylla Prokh. in Bull. Jard. Bot. URSS XXIX : 556 (1930).-Rech. f., l. c. 41 (1964).

Distr. Afghanistan, Tadzhikistan, and W. Pakistan.

Euphorbia falcata L.-K. F. A. 257.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 264), Borak, Badakhshan (Sept. 4, 1960 R. Y.).

Euphorbia Franchetii B. Fedtsch. in O. et B. Fedtsch., Consp. Fl. Turk. VI : 310 (1916).-Rech. f., l. c. 31 (1964).

Distr. Pam.-Al., Turcomania and Afghanistan.

Euphorbia Helioscopia L.-K. F. A. 257.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 8).

Euphorbia inaequilatera Sond. in Linnaea XXIII : 105 (1850).-Rech. f., l. c. 18 (1964).

Euphorbia sanguinea Hochst. et Steud.-K. F. A. 261.

Distr. South Africa, Arabia, Afghanistan and India.

Euphorbia inderiensis Less. ex Kar. et Kir. in Bull. Soc. Nat. Mosc. XV : 448 (1842).-Rech. f., l, c. 19 (1964).

Distr. Iran, Turcomania and Afghanistan.

Euphorbia (Tithymalus) **megalocarpa** Rech. f. in Anz. Math.-Naturw. Kl. Oesterr. Akad. Wiss. 1963 Nr. 4 : 2 (1963).

Distr. Afghanistan.

Euphorbia (Tithymalus) **malurensis** Rech. f. in Anz. Math.-Naturw. Kl. Oesterr. Akad. Wiss. 1963 Nr. 4 : 1 (1963).

Distr. Afghanistan.

Euphorbia microsciadia Boiss., Diag. Pl. Or. Nov. Ser. I, VII: 89 (1946).-Rech. f., l. c. 36 (1964).

Distr. Iran, Afghanistan, and W. Pakistan.

Euphorbia Seguieriana Neck.-K. F. A. 261.

subsp. **Niciciana** (Borb.) Rech. f. in Ann. Nat. Mus. Wien. LVI: 212 (1948).-Rech. f., l. c. 43 (1964).

Distr. subsp. Balkan Peninsl., Asia minor, Iran, Afghanistan, and W. Pakistan.

Euphorbia spinidens Bornm. ex Prokh., Consp. Syst. Tithym. Asiae Mediae 208 (1933).-Rech. f., l. c. 45 (1964).

Distr. Iran, Pam.-Al., and Afghanistan.

Euphorbia Turczaninowii Kar. et Kir. in Bull. Soc. Nat. Mosc. XV: 447 (1842).-Rech. f., l. c. 21 (1964).

Distr. Afghanistan, Turcomania, and Songaria.

Euphorbia (Tithymalus) **Volkii** Rech. f., l. c. 2 (1963).

Distr. Afghanistan.

Aceraceae

Acer Semenovii Regel et Herder in Bull. Soc. Nat. Mosc. XXXIX, 1: 550 (1866).-Pojarkova in Fl. URSS XIV: 603.-Wendelbo in Acta Univ. Berg. Math.-Naturv. 1963, no. 18: 51 (1964).

Distr. Pam.-Al., Tianshan and Afghanistan.

Balsaminaceae

Impatiens amphorata Edgew.-K. F. A. 226, Fl. Pl. W. Pakistan 103 (1964).

Nuristan: between Voma and Chatrass (Aug. 1, 1955 S. Kitamura)-erroneously placed under I. Lemanni Hooker f. et Thomson in K. F. A. 266.

Distr. Afghanistan, W. Pakistan and Himalayas (from Kashmir to Nepal).

Impatiens brachycentra Kar. et Kir.-K. F. A. 226.

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1119), (Sept. 4, 1960 R. Y. nos. 1023, 1024), between Faizabad and Borak (July 7-8, 1960 R. Y. no. 327).

Vitaceae

Ampelopsis vitifolia (Boiss.) Planchon.-K. F. A. 268.

Between Borak and Faizabad (Sept. 15, 1960 R. Y. no. 1304)-fr., between Faizabad and Borak (July 7-8, 1960 R. Y. no. 92)-fl.

Malvaceae

Althaea × Litwinowii Iljin in Notulae System. Kom. V: 1 (1924).-A. nudiflora × A. rhyticarpa.

Alcea × Litwinowii (Iljin) Iljin in Fl. URSS XV: 111 (1949).

Althaea rosea auct. non Cav.-Aitch. in Journ. Linn. Soc. XVIII: 39.-K. F. A.

270 pro parte quoad specim.

Between Shibar and Chardi-i-Ghorband (July 11, 1955 S. Kitamura).

Distr. Tianshan, Pam.-Al., Dz.-Kashg. and Afghanistan.

Althaea nudiflora Lindley in Trans. Hort. Soc. VII: 251 (1831).-Baker in Journ. Linn. Soc. XXVIII: 208.

Alcea nudiflora (Lindl.) Boiss., Fl. Or. I: 833 in observ. (1867).-Iljin in Fl. URSS XV: 108 (1949).

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1118).

Distr. Altai, Dz.-Tarb., Tianshan, Pam.-Al., Dz.-Kashg. and Afghanistan.

Guttiferae

Hypericum perfolatum L.-K. F. A. 271.

Borak, Badakhshan (July 13, 1960 R. Y. nos. 290, 289), (Sept. 4, 1960 R. Y. no. 1000), (Aug. 12, 1960 R. Y. no. 352), between Faizabad and Borak (July 7-8, 1960 R. Y. no. 316).

Hypericum scabrum L.-K. F. A. 271.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 24)-ante anthesin.

Tamaricaceae

Myricaria squamosa Desv. in Ann. Sc. Nat. IV: 350 (1825).-Gorschkova in Fl. URSS XV: 325.-Schiman-Czeika in Symb. Afgh. V: 23 (1963).

Mt. Noshaq 3040 m alt. (July 17-20, 1960 R. Y. nos. 436, 426, 435).

Distr. Caucasus, Siberia, Central Asia, Iran, Afghanistan, W. Pakistan, Himalayas and North China.

Reaumuria sogdiana Komar. in Trav. Soc. Nat. Pétersbg. XXVI: 195 (1896).-Schiman-Czeika in Rech. f., Fl. Iran. Tamaricaceae 3 (1964).

Distr. Iran, Turcomania, and Afghanistan.

Tamarix aravensis Zohary, Tropical Woods 104 : 50 (1956).-Schiman-Czeika in Symb. Afgh. V: 20 (1963).

Distr. Afghanistan.

Tamarix bachtiarica Bunge ex Boiss., Fl. Orient. I: 772 (1867).-S.-Czeika, l. c. 20 (1963).

Distr. Iran and Afghanistan.

Tamarix dubia Bunge, Tent. Gen. Tam. 18 (1852).-S.-Czeika in Fl. Iran. Tam. 8 (1964).

Distr. Iran and Afghanistan.

Tamarix gallica L., Sp. Pl. 270 (1753).-Schiman-Czeika, l. c. 20 (1963).

Distr. From Europe and North Africa to Afghanistan.

Tamarix hispida Willd., Abhandl. Physik. Kl. Akad. Wissensch. 1812-1813: 77 (1816).-Gorschk. in Fl. URSS XV: 308, Tab. XVI, fig. 2 (1949).-S.-Czeika, l. c. 20 (1963).

Distr. Niz.-Borz, Central Asia, Afghanistan, Mongolia and China.

Tamarix karakalensis Freyn et Sint. in Bull. Herb. Boiss. 2 Sér. III: 1060 (1903).-S-Czeika in Fl. Iran. Tam. 13 (1964).

Distr. Turcomania and Afghanistan.

Tamarix Kotschyii Bunge, Tentamen Gen. Tamar. Spec. 30 (1852).-Boiss., Fl. Orient. I: 770.-Gorshk., l. c. 301.-S.-Czeika, l. c. 20 (1963).

Distr. Caucasus, Kara-Kum., Gorn.-Turkm., Pam.-Al., Iran and Afghanistan.

Tamarix laxa Willd. in Abh. Phys. Kl. Preuss. Acad. Wissensch. 1812-13: 82 (1916).-Boiss., Fl. Or. I: 770.-Gorschk. in Fl. URSS XV: 302, Tab, XV, fig. 4 (1949).-S.-Czeika, l. c. 20 (1963).

Distr. Europe, Caucasus, Siberia, Central Asia, Iran, Afghanistan and Mongolia.

Tamarix Litwinowii Gorschk. in Sched. Herb. Fl. URSS X Fasc. LXI-LXIV: 24 (1936), in Fl. URSS XV: 300, Tab. XV, fig. 3 (1949).-S.-Czeika, l. c. 20 (1963).

Distr. Central Asia, Iran and Afghanistan.

Tamarix tetrandra Pall. in Neue Nord. Beitr. VII: 430 (1796).-Boiss., Fl. Orient. I: 769.-Gorschk., l. c. 298 (1949).-C.-Czeika, l. c. 21 (1963).

Distr. From Mediterranean Region to Afghanistan.

Thymelaeaceae

Daphne mucronata Royle β. affghanica Meissn. in DC., Prodr. XIV: 536 (1857). -errore Meissn., l. c. 322.-K. F. A. 275.

Diarthron vesiculosum (Fischer et Meyer) C. A. Mey. in Bull. Ac. Pétersb. I: 352 (1843).-Endl., Gen. Suppl. IV, II: 63 (1847).-K. F. A. 275.

Between Borak and Faizabad (Sept. 15, 1960 R. Y. nos. 1301, 1302).

Distr. Eastern Europe, Caucasus, Asia minor, Iran, Central Asia, Afghanistan, Sungaria and W. Pakistan.

Elaeagnaceae

Elaeagnus angustifolia L.-K. F. A. 276.

Borak, Badakhshan (Sept. 12, 1960 R. Y. nos. 1138, 1139)-sterile.

Oenotheraceae

Chamaenerium latifolium (L.) Th. Fr. et. Lange.-K. F. A. 279.

Mt. Noshaq, Qasideh Valley 3040 m (July 17-20, 1960 R. Y. nos. 449, 450).

Flowers small, petals 12-16 mm long.

In Himalayas another species C. conspersum occurs.

Chamaenerium consperum (Haussk.) Kitamura comb. nov.

Epilobium conspersum Haussknecht in Oesterr. Bot. Zeitschr. XXIX: 51 (Feb. 1879).-Reven in Bull. Brit. Museum Botany Vol. II: 350 (1962).

Chamaenerium reticulatum (C. B. Clarke) Kitamura, in Fauna & Flora of Nepal Himal. 185 (1955).

Epilobium reticulatum C. B. Clarke in Hooker f., Fl. Brit. Ind. II: 583 (May 1879).

Nepal: Tolo Gompa Khola 3600 m (July 14, 1953 S. Nakao), between Wallum chun Gola and Deoma 3900 m (Aug. 10, 1962 K. Nishioka no. 1064), between Ghunsa and Kangbachen 3800 m (Sept. 26, 1962 K. Nishioka no. 1061), between Mouma and Wallum chun Gola 3900 m (July 24, 1962 K. Nishioka no. 1262).

Bhutan: Sinche La 4200 m (Aug. 29, 1958 S. Nakao no. 229), between Trongsa Dzong and Tashiling 1800 m (Oct. 3, 1958 S. Nakao no. 632).

Distr. Himalayas from Central Nepal to China (Szechwan and Yunnan).

Epilobium chitralense Raven in Bull. Brit. Mus. Bot. II: 379, plate 39A (1962).

Nuristan, Shabul-Gul (Aug. 6, 1955 S. Kitamura).

Distr. Afghanistan (Nuristan) and W. Pakistan.

Epilobium confusum Hausskn. in Oesterr. Bot. Zeitschr. XXIX: 151 (1879).-Raven in Rech. f., Fl. Iran. Onagraceae 14 (1964).

Distr. Anatolia, Caucasus, Iran and Afghanistan.

Epilobium cylindricum D. Don, Prodr. Fl. Nep. 222 (1825).-Raven in Ann. Naturh. Mus. Wien LXV: 33 (1962), l. c. 355 (1962).

E. tianschanicum Pavlov (1949). *E. Beauverdianum* Léveillé (1910).

Nuristan: Eshtaway (Aug. 7, 1955 S. Kitamura).

Distr. Afghanistan, Tianshan, Himalayas and China.

Epilobium glaciale Raven, l. c. 368, plate 34 B (1962).

Nuristan, between Pushki and Kushitaki (Aug. 4, 1955 S. Kitamura).

Distr. Afghanistan, W. Pakistan and Kashmir.

Our specimens differ slightly from the type (ex desc.) by the serrulate leaves.

Epilobium hirsutum L. var. tomentosum (Vent.) Boiss.-K. F. A. 279.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1026), (July 12-13, 1960 R. Y. nos. 272, 840).

Epilobium laxum Royle, Ill. Bot. Himal. Mount. 211 t. 43 fig. 2 (1835).-Raven l. c. 369 (1962).-Wendelbo in Acta Univ. Berg. series Math.-Naturw. 1963 no. 18: 51 (1964).

Epilobium amplectens Benth. ex Hausskn. (1884). *E. subnivale* Popov (1934). *E. Duthiei* Haussk. (1884).

Distr. Afghanistan, W. Pakistan, Tianshan and Himalayas.

Epilobium leiophyllum Hausk. in Oesterr. Bot. Zeitsch. XXIX: 52 (1879), Monogr. Epilob. 217 t. 4, fig. 4 (1884).-Raven in Ann. Naturhist. Mus. Wien LXV: 33 (1962).-Wendelbo in Acta Univ. Berg. Series Math.-Naturw. 1963 no. 18: 52 (1964).

Distr. Afghanistan, W. Pakistan, Kashmir and Punjab.

Epilobium minutiflorum Haussk.-K. F. A. 280.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 863, 879), Pagman (June 17, 1960 R. Y.

no. 34).

Epilobium palustre L., Sp. Pl. 348 (1753).-Steinb. in Fl. URSS XV : 613 (1949). -Wendelbo, l. c. 52 (1964).

Distr. Northern Hemisphere.

The following Nepalese specimens belongs to E. palustre L.

Nepal : Tsarka 4150 m (Aug. 13, 1958 O. Namikawa nos. 28, 74), near Po 3850 m (Sept. 18, 1958 K. Nishioka no. 210).

Epilobium Royleanum Haussk. in Oesterr. Bot. Zeitschr. XXIX : 55 (1879), Monogr. 205 (1884).-Lével., Ic. Epil. t. 66.-Raven, l. c. 358 (1964).

Ishkashim (Aug. 29-31, 1960 R. Y. no. 959).

Distr. Afghanistan, W. Pakistan, Himalayas and China.

Our specimens from W. Pakistan are the following.

Hindukush : Yashin 2600 m (Aug. 9, 1957 K. Ogino no. 385), Yashin 2550 m (Aug. 7, 1957 K. Ogino no. 352 p.p.), Dahimal, 2500 m (Aug. 1, 1957 K. Ogino no. 598), Gupis 2170 m (Aug. 1, 1957 K. Ogino no. 578).

Karakoram : Monjong 3200 m (July 25, 1955 S. Nakao).

Swat : between Kalam and Paloza 2200 m (July 18, 1957 K. Ogino nos. 46, 55).

Epilobium tibeticum Haussk., l. c. 53 (1879), Monogr. 201 (1884).-Lével., l. c. t. 75.-Raven, l. c. 357 (1962).-Wendelbo, l. c. (1964).

Epilobium nuristanicum Rech. f.-K. F. A. 280.

Distr. Afghanistan, W. Pakistan and Kashmir.

Hippuridaceae

Hippuris vulgaris L., Sp. Pl. 4 (1753).-Kitamura, Fl. Pl. W. Pakistan 108 (1964).

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R, Y. no. 395).

Distr. Northern Hemisphere, Antarctic America and Australia.

Umbelliferae

Anisosciadium orientale DC. in Mém. Umb. 63, tab. 15.-Boiss., Fl. Orient. II : 950 (1872).-Rechinger f. et Riedl, Symb. Afgh. V : 28 (1963).

Distr. Iraq, Iran and Afghanistan.

Aphanopleura leptoclada (Aitch. et Hemsl.) Lipsky.-K. F. A. 283.

Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 350).

Berula orientalis Woron nom. seminud. Fl. Iugo-Vost. V : 796 (1931).-Schishkin in Fl. URSS XVI : 417 (1950).-Rechinger f. et Riedl, l. c. 32 (1963).

Distr. Central Asia, Iran and Afghanistan.

Bunium afghanicum Beauverd in Bull. Soc. Bot. Genève XXI : 227 (1929).-Rech. f. et Riedl, l. c. 34, Fig. 10 (1963).

Distr. Afghanistan.

Bunium cylindricum (Boiss. et Hohen.) Drude in Pflanzenfamilien III, 8 : 194 (1898).-Korovin in Fl. URSS XVI : 411 (1950).-Rech. f. et Riedl, l. c. 34 (1963).

Distr. Pam.-Al., Syr-Dar., Tianshan, Iran and Afghanistan.

Bunium Lindbergii Rech. f. et Riedl, l. c. 33, Fig. 9 (1963).

Distr. Afghanistan.

Bupleurum falcatum subsp. **marginatum** (Wall.) C. B. Clarke ex Wolff in Pflanzenreich, Heft 43: 133 (1910).

B. marginathum Wall. ex DC., Prodr. IV : 132 (1830).-Rech. f. et Riedl in Symb. Afgh. V : 41 (1963).

Distr. Afghanistan (Nuristan), Himalayas and China.

Bupleurum rapiferum Gilli in Fedde, Rep. Sp. Nov. LXI : 195 (1959).

Distr. Afghanistan.

Bupleurum subuniflorum Boiss. et Heldr.-K. F. A. 284.

B. nematocladum Rech. f. et Riedl, l. c. 42, Fig. 13, 14 (1963).

Carum Carvi L.-K. F. A. 284.

Mt. Noshaq, Qasideh Village (July 16, 17, 1960 R. Y. no. 404), Ishkashim (Aug. 29-31, 1960 R. Y. nos. 762, 763), between Kabul and Pagman (June 17, 1960 R. Y. no. 44).

Chaerophyllum aquilegifolium Rech. f. et Riedl, l. c. 44, Fig. 15 (1963).

Distr. Afghanistan (Nuristan).

Chaerophyllum nuristanicum Rech. f. et Reidl, l. c. 44, Fig. 16 (1963).

Distr. Afghanistan (Nuristan).

Coriandrum sativum L., Sp. Pl. 256 (1753).-Kitam., Fl. Pl. W. Pakistan 109 (1964).

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 772, 902, 903).

Distr. Cultivated plant.

Cremastosciadium leucorymbe Rech. f. et Riedl, l. c. 47, Fig. 17, 18 (1963).

Distr. Afghanistan (Nuristan).

Daucus Carota L.-K. F. A. 285.

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 1009), between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 259)-fl.

Dorema Ammoniacum Don in Trans. Linn. Soc. XVI : 601 (1833).-Boiss., Fl. Orient. II : 1008 (1872).-Rech. f. et Riedl in Symb. Afgh. V : 50 (1963).

Distr. Iran and Afghanistan.

Ducrosia anethifolia (DC.) Boiss. in Ann. Sc. Nat. 1844 : 923.-Kitamura, Fl. Pl. W. Pakistan 109 (1964).-Rech. f. et Riedl in Symb. Afgh. V : 50 (1963).

Distr. Iraq, Iran, Afghanistan and W. Pakistan.

Ducrosia ovatiloba Dunn et R. Williams in Kew Bull. 1921 : 120.-Rech. f. et Riedl in Symb. Afgh. V : 50 (1963).

Nuristan : Between Voma and Trokikhor (July 31, 1955 S. Kitamura).

Distr. Afghanistan (Nuristan) and W. Pakistan.

Echinophora scabra Gilli in Fedde, Rep. Sp. Nov. LXI : 191 (1959).-Rech. f. et Riedl in Symb. Afgh. V : 50, Fig. 20 (1963).

Distr. Afghanistan.

Echinophora Sibthorpiana Guss., Suppl. Fl. Sci. Prodr. 69 (1832-43).-Boiss., Fl. Orient. II : 949.-Bobrov in Fl. URSS XVI : 90, Tab. V-2.-Rech. f. et Riedl, l. c. 51 (1961).

Between Borak and Faizabad (Sept. 15, 1960 R. Y. no. 1305).

Distr. Caucasus, Syr-Dar., Pam.-Al., Asia minor, Arum.-Kurd., Iran and Afghanistan.

Eleuterospermum minjanense Rech. f. in Symb. Afgh. V : 88, Fig. 54 (1963).

Distr. Afghanistan.

Eringium Biebersteinianum Nevski.-K. F. A. 285.

Between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1192).

Eringium Bungei Boiss., Fl. Or. II. 824 (1872).-Bobrov in Fl. URSS XVI : 83 (1950).-Rech. f. et Riedl in Symb. Afgh. V : 55.

Distr. Iran, Gorn.-Turkm. and Afghanistan.

Eringium nigromontanum Boiss. et Buhse, Aufz. Pfl. Reise Transk. Pers. 95 (1860).-Bobrov in Fl. URSS XVI : 78 (1950).-Rech. f. et Riedl, l. c. 55, Fig. 22 (1963).

Distr. Caucasus, Arm.-Kurd., Iran and Afghanistan.

Eringium polycephalum Hsskn. ex Wolff in Pflanzenreich Heft 61 : 153 (1913). -Rech. f. et Riedl, l. c. 56, Fig. 23 (1963).

Dal-ul-Aman (July 18, 1955 S. K.)-erroneously placed under E. carlinoides.-K. F. A. 286.

Ferula afghanica Gilli in Fedde, Rep. Sp. Nov. LXI : 202 (1959).-Rech. f. et Riedl, l. c. 59, Fig. 24, a, b (1963).

Distr. Afghanistan.

Ferula afghanistanica Hiroe (1958) (not Ferula afghanica Hiroe.-K. F. A. 286) is a syn. of F. badrakema K.-Pol.-K. F. A. 286.

Ferula crucifolia Gilli in Fedde, Rep. Sp. Nov. LXI : 203 (1959).-Rech. f. et Riedl in Symb. Afgh. V : 59, Fig. 25 (1963).

Distr. Afghanistan.

Ferula eburnea Rech. f. in Symb. Afgh. V. 61, Fig. 26, 27 a, b (1963).

Distr. Afghanistan.

Ferula glabra Rech. f. et Riedl in Symb. Afgh. V : 65, Fig. 28, a, b (1963).

Distr. Afghanistan.

Ferula Grigoriewii B. Fedtsch. in Trav. Mus. Bot. Ac. Sc. Pétersb. I : 137 (1902).-Eug. Korovin, Monogr. Ferula 53, Tab. XXV, fig. 1.

Mt. Noshaq, Qasideh Valley, 3040 m (July 17-20, 1960 R. Y. nos. 459, 464).

Distr. Pam.-Al. and Afghanistan (Wakhan).

Ferula heratensis Rech. f. in Symb. Afgh. V : 68, Fig. 29, 30 (1963).

Distr. Afghanistan.

Ferula Jaeschkeana Vatke.-K. F. A. 286 excl. specim. nuristanicis.

Between Sarobi and Kabul (June 18, 1955 S. K.), Shibar Pass (June 24, 1955 S.

K.), Doab (June 24, 1955 S. K.)-the specimens were misplaced under F. diversivittata Regel & Schmalh.-K. F. A. 286.

subsp. **taenioloba** Rech. f. et Riedl in Symb. Afgh. V : 69 (1963).

Distr. Afghanistan.

Ferula khorasanica Rech. f. et Aell. in Anzeiger Math. Naturw. Kl. Österr. Akad. Wiss. 1952, Nr. 11 : 7.-Rechinger f. et Riedl in Symb. Afgh. V : 70, Fig. 33, 34.

Distr. Afghanistan.

Ferula Koelzii Rech. f. et Riedl, l. c. 70 (1963).

Distr. Afghanistan.

Ferula kopedagensis Eug. Korovin, Monogr. Ferula 61, Tab. XXXVIII-fig. 1 (1947).

Distr. Afghanistan, Gorn.-Turkm. and Pam.-Al.

Ferula Lehmannii Boiss., Fl. Or. II : 992 (1872).-Eug. Korovin in Fl. URSS XVII : 77, Tab. X fig. 9 (1951).-Rech. f. et Riedl in Symb. Afgh. V : 72.

Distr. Aralo-Casp.. Kyz.-Kum., Kara-Kum., and Afghanistan.

Ferula microloba Boiss., l. c. 989 (1872).-Eug. Korovin, Monogr. Ferula 27, Tab. VII-1 (1947), in Fl. URSS XVII : 77.

Distr. Caucasus, Central Asia, Iran, and Afghanistan.

Ferula myrioloba Rech. f. in Symb. Afgh. V : 72, Figs. 35, 36, 37 (1963).

Distr. Afghanistan.

Ferula nuristanica Kitamura in Acta Phytotax. Geobot. XIX : 101 (March 1963).

F. Jaeskeana (non Vatke) Kitam., F. A. 286 quoad specim. nuristan.

F. nursitanica Rech. f. in Symb. Afgh. V : 74, Figs. 38, 39.

Distr. Afghanistan.

As I received Symbolae Afghanicae V from Dr. Rechinger in Dec. 1964, I did not know the publication of the same name in 1963.

I do not know the date of the publication of Symbolae Afghanicae V.

My description was taken from the specimens with fruits and Rechinger's one was from the specimens with flowers.

Ferula stenocarpa Boiss. et Hausskn. in Fl. Orient. II : 990 (1872).-Eug. Korovin, Monogr. Ferula 46 (1947).-Rech. f. et Riedl, l. c. 77 (1963).

Distr. Iran and Afghanistan.

Ferula stenoloba Rech. f., l. c. 77, Figs. 42, 43, 44 (1963).

Distr. Afghanistan.

The figures look like that of F. karatavica Regel et Schmalh. (Distr. Tianshan and Pam.-Al.) in Korovin. Monogr. Ferula, Tab. XLII, fig. 2.

Ferula trachyphylla Rech. f. et Riedl in Symb. Afgh. V : 80, Figs. 45, 46 (1963).

Distr. Afghanistan.

Heracleum afghanicum Kitamura, F. A. 287, Fig. 81.

Add. This species differs from H. leucocarpum from Kuram Valley, by the

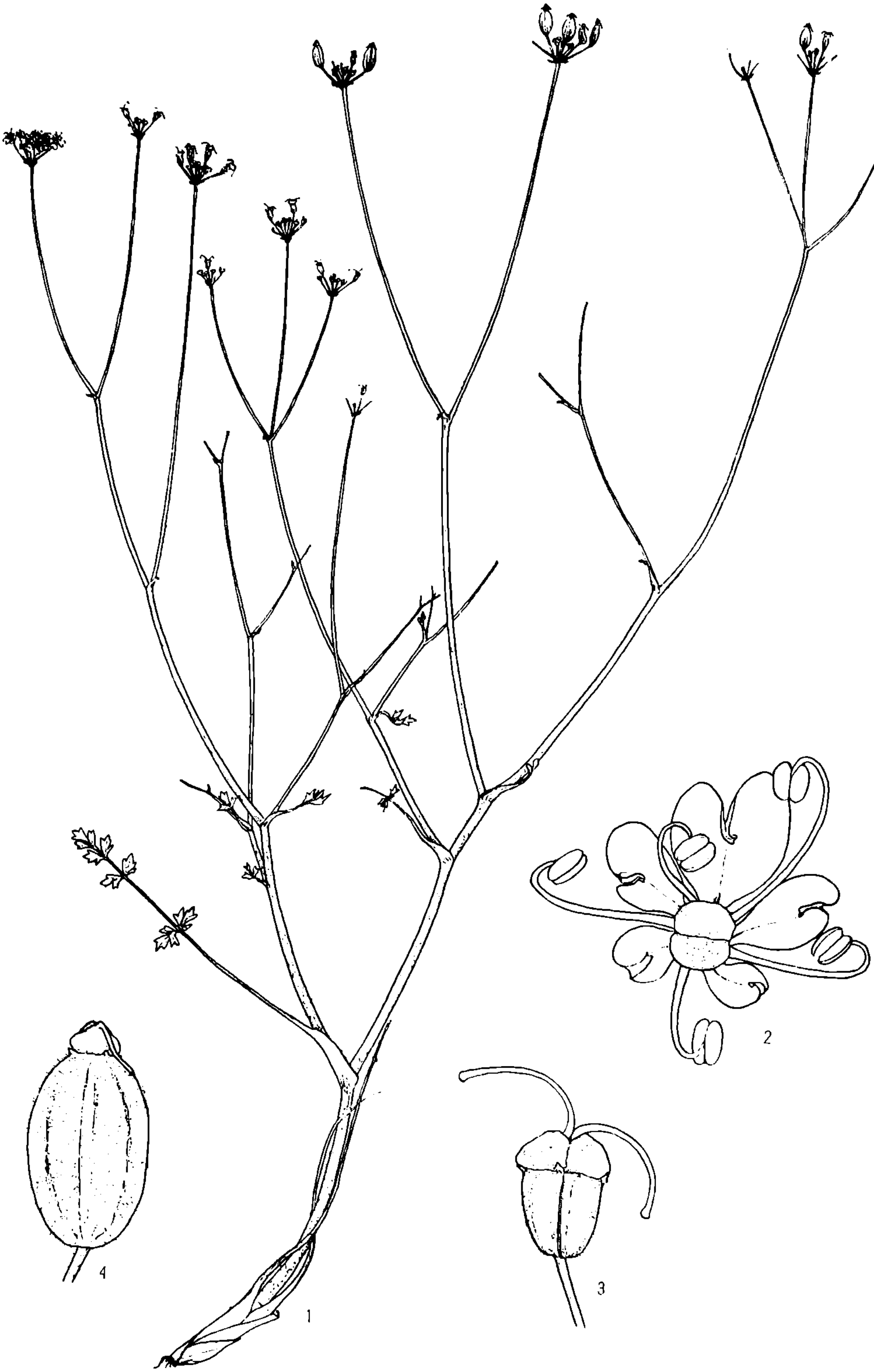

Fig 2 Heracleum Yoshiii Kitamura 1 Fruiting plant 2 Flower 3 Young Fruit 4 Fruit (Wakhan : Mt. Noshaq).

stem densely pilose and the leaves densely pubescent beneath (not sparsely pilose), and by the more numerous rays which are 30-35 in number (not 25). This species is related to H. pubescens M. B.

Heracleum Olgae Regel et Schamalh., Plantae Novae Fedtschenko 38 (1882).-Mandenova in Fl. URSS XVII : 257 (1951).

H. nubigeum Hiroe, Umbelliferae of Asia I : 192, quoad. pl. Koelz no. 12609 (UC).

H. polyadenum Rech. f. in Symb. Afgh. V : 85, Figs. 50, 51, 52.

Mt. Noshaq, Qasideh Valley 3040 m (July 26, 1960 R. Y. nos. 494, 495).

Distr. Afghanistan and Pam.-Al.

Heracleum pinnatum C. B. Clarke in Hooker f., Fl. Brit. Ind. II : 712 (1879).-Kitamura, Fl. Pl. West Pakistan 111 (1964).

H. multibracteatum Rech. f., Symb. Afgh. V : 83 (1963), Figs. 48, 49.

Distr. Afghanistan (Nuristan), Kashmir and Karakoram.

Heracleum subglabrum Kitamura in Acta Phytotax. Geobot. XIX : 101 (March 1963).

H. cardiocarpum Rech. f. et Riedl in Symb. Afgh. V : 81, Fig. 47.

Distr. Afghanistan.

Heracleum Thomsonii C. B. Clarke in Hooker f., Fr. Brit. Ind. II : 711 (1879).

Platytaenia lasiocarpa (Boiss.) Rech. f. et Riedl subsp. *Thomsonii* (C. B. Clarke) Rech. f. et Riedl in Symb. Afgh. V : 104, Figs. 67, 68, 61.

Distr. Afghanistan (Nursitan), W. Pakistan, and Kashmir.

Rechinger and Riedl reported P. lasiocarpa subsp. incana and subsp. radiata from Afghanistan.

Heracleum Yoshiii Kitamura in Acta Phytotax Geobot. XIX : 102 (1963). **Fig. 2.**

Species H. Thomsonii affinis a quo caule albo-floccoso, umbellae radiis 2–4, elongatis 7.5–9 cm longis divergit.

Perennis. Caulis caespitosus basi arcuatus, vaginis foliorum anni praecedenti persistentibus obtectus, 25–35 cm altus 1.5 mm diametro, inferne albo-floccosus, ramosus, ramis ascendentibus rigidiusculis glabrescentibus. Folia radicalia et inferiora, 8–15 cm longa, petiolis 4–12 cm longis basi vaginato-dilatatis, albo-floccosis, lamina ambitu anguste oblonga 3–4 cm longa 1 cm lata, pinnatisecta, laciniis remotis in sicco viridibus parce floccosis, ovatis pinnatifidis, lobulis obtusis. Folia superiora pauca sursum depauperata, petiolis inferne vaginatis margine hyalinis. Umbellae radiis 2–4, in fructu 7.5–9 cm longis glabris, bracteis 1, lanceolatis 2–3 mm longis margine floccosis bracteatae. Umbellulae sub anthesi 11–13 mm diametro, pedicellis 10, post anthesin 5–8 mm longis, pilis brevibus, patentibus dense pubescentibus, bracteolis 3–4, ovato-lanceolatis 2–3 mm longis margine hyalinis floccosis involucellatae. Petala alba zygomorpha glabra, exteriora late obovata 3.5–4 mm longa et lata, ad medium profunde sinuata et breviter cuspidata, cuspide incurva, interiora obovata et cuspidata 2.2 mm longa 1 mm lata, apice incurva.

Fructus immaturus valde compressus dense pubescens, 5 mm longus 3 mm latus facie 3-striatus.

Afghanistan, Wakhan: Mt. Noshaq, Qasideh Valley 3200 m (Aug. 1, 1960 R. Y. Typus in Herb. Univ. Kyoto. no. 575, isotypus nos. 507, 576, 560), 3040 m (July 26, 1960 R. Y. nos. 507, 508).

This species belongs to Platytaenia. This differs from Platytaenia pamirica by longer rays 7.5-9 cm long (not 2-4 cm long) and smaller fruits (not 10 cm long 5 mm broad).

Rechinger and Riedl published Platytaenia macrocarpa in Symb. Afgh. V: 110, Figs. 72, 73 from N. E. Afghanistan.

Distr. Afghanistan.

Johrenia racemoso-umbellata Gilli in Fedde, Rep. Sp. Nov. LXI: 198 (1959).

Distr. Afghanistan.

Korovinia tenuisecta (Regel et Schmalh.) Nevski et Vved.-K. F. A. 289.

Johrenia platypoda Aitch. et Hemsl.-K. F. A. 289.

Ligusticum afghanicum Rech. f. in Symb. Afgh. V: 94, Fig. 57, 58 (1963).

Distr. Afghanistan and W. Pakistan.

Ligusticum irramosum Rech. f. et Riedl, l. c. 94, Fig. 60.

Distr. Afghanistan.

Ligusticum marginatum C. B. Clarke in Hooker f., Fl. Brit. Ind. II: 698 (1879).-Rech. f. et Riedl, l. c. 97, Fig. 61.

Distr. Northwest Himalaya, W. Pakistan, and Afghanistan.

Ligusticum Thomsonii C. B. Clarke in Fl. Brit. Ind. II: 698.-Rech. f. et Riedl, l. c. 97, Fig. 62.

Distr. Kashmir, W. Pakistan and Afghanistan.

Peusedanum ferulaefolium Gilli in Fedde, Rep. Sp. Nov. LXI: 204 (1959).-Rech. f. et Riedl, l. c. 98, Fig. 63.

Distr. Afghanistan.

Pimpinella Griffithiana Boiss.-K. F. A. 289.

Borak, Badakhshan (July 13, 1960 R. Y. nos. 258, 293), (July 7, 1960 R. Y. no. 328), between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 257).

Pimpinella kuramensis Kitamura, F. A. 289.

Platytaenia tripartita (Aitch. et Hemsl.) Rech. f. et Riedl, l. c. 135 (1963).

Pimpinella puberula (DC.) Boiss. in Ann. Sc. Nat. Sér. 3, I: 129 (1844), Flora Orient. II: 866.-Rech. f. et Riedl, l. c. 102.

Distr. Syria, Iran and Afghanistan.

Pimpinella Tragium Villar, Prosp. 24 (1779).-Boiss., Fl. Or. II: 811.-Rech. f. et Riedl, l. c. 103.

Distr. From Southern Europe and North Africa to Iran and Afghanistan.

Pinacantha porandica Gilli in Fedde, Rep. Sp. Nov. LXI: 207 (1959).

Peusedanum porandicum (Gilli) Rech. f. et Riedl, l. c. 99 (1963).

Distr. Afghanistan.

Pleurospernum Candollii Benth. ex C. B. Clarke in Hooker f., Fl. Brit. Ind. II : 703 (1879).

Hymenolaena Candollii DC., Prodr. IV : 245 (1830).

Hymenolaena pimpinellifolia Rupr., Sert. Tiansch. 49 (1869).-Schishkin in Fl. URSS XVI : 233, Tab. XVIII, fig. 1.

Mt. Noshaq 4000 m (Aug. 21, 1960 R. Y. nos. 728, 725), 3800-4000 m (Aug. 4. 1960 R. Y. no. 632).

Distr. Afghanistan, Tianshan, Pam.-Al. and Himalayas (to Nepal).

Pleurospermum corydalifolium Aitch. et Hemsl.-K. F. A. 289.

Hymenolaena corydalifolium (Aitch. et Hemsl.) Rech. f. et Riedl, l. c. 88 (1963).

Pleurospermum stylosum C. B. Clarke in Hooker f., Fl. Brit. Ind. II : 704 (1879).

Aulacospermum stylosum (C. B. Clarke) Rech. f. et Riedl, l. c. 28, Figs. 4, 5, 6, 7-8.

Mt. Noshaq 3200 m (Aug. 1, 1960 R. Y. no. 564).

Distr. Afghanistan, W. Pakistan and Kashmir.

Pleurospermum pulchrum Aitch. et Hemsl.-K. F. A. 289.

Aulacospermum pulchrum (Aitch. et Hemsl.) Rech. f. et Riedl, l. c. 32 (1963).

Prangos akymatodes Rech. f. et Riedl in Symb. Afgh. V : 111, Figs. 74, 75.

Distr. Afghanistan.

Pyramidopterca cabulica Boiss., Diag. Ser. 2, II : 106 (1856).-Fl. Orient. II : 1089.-Rech. f. et Riedl, l. c. 114, Figs. 76, 77 (1963).

Distr. Afghanistan.

Pycnocycla cephalantha Rech. f. et Riedl in Symb. Afgh. V : 117, Fig. 82.

Distr. Afghanistan.

Scaligeria allioides (Regel et Schmalh.) Boiss., Fl. Orient. Suppl. 255 (1888).-Korovin in Fl. URSS XVI : 212.-Rech. f. et Riedl, l. c. 120 (1963).

Between Pulikhumri and Haibak (June 27, 1955 S. Kitamura).

Distr. Iran, Gorn.-Turkm., Pam.-Al., Tianshan and Afghanistan.

Scaligeria polyantha Rech. f. in Symb. Afgh. V : 121, Fig. 85 (1963).

Distr. Afghanistan.

Scaligera scariosibracteata Rech. f. et Riedl in Symb. Afgh. V : 123, Fig. 86 (1963).

Distr. Afghanistan (Nuristan).

Described by the specimens without matured fruits.

Scaligeria setacea (Schrenk) Korovin in Tr. Sredneaz. Gos. Univ. Ser. VIII-b, 2 : 67 (1928), in Fl. URSS XVI : 217.-Rech. f. et Riedl in Symb. Afgh. V : 124.

Carum setaceum Schrenk.

Distr. Tianshan, Dz-Tarb., Pam.-Al. and Afghanistan.

Scandix stellata Soland in Russel. Alepp. ed. 2, II : 249 (1794).-Schishkin in Fl. URSS XXI : 146 (1950).-Rech. f. et Riedl in Symb. Afgh. V : 125 (1963).

Distr. Europe, Central Asia and Afghanistan.

Selinum afghanicum Rech. f. et Riedl in Symb. Afgh. V : 126, Fig. 87 (1963).

Distr. Afghanistan.

Selinum duriusculum Rech. f. et Reidl, l. c. 127, Fig. 88 (1963).

Distr. Afghanistan.

Silaus afghanicus Gilli in Fedde, Rep. LXI : 197 (1959).-Rech. f. et Riedl in Symb. Afgh. V : 129, Fig. 90 (1963).

Distr. Afghanistan.

Spongiosyndesmus afghanicus Gilli in Fedde, Rep. Sp. Nov. LXI : 201 (1959). -Rech. f. et Riedl in Symb. Afgh. V : 130, Fig. 91.

Between Bulola and Duab (June 25, 1955 S. Kitamura), Duab (July 10, 1955 S. Kitamura).

Distr. Afghanistan.

Sium latijugum C. B. Clarke in Hooker f., Fl. Brit. Ind. II : 683 (1879).

Borak, Badakhshan (Sept. 4, 1960 R. Y. nos. 1010, 975, 974).

Distr. Kashmir, W. Pakistan and Afghanistan.

Calyx absent, furrows 1-vittate, ridges wide corky.

Torilis arvensis (Huds.) Link, Enum. Horti Berol. I : 265 (1821).-Schshikin in Fl. URSS XVI : 159.-Rech. f. et Riedl in Symb. Afgh. V : 130 (1963).

Torilis japonica Kitamura (non DC.) F. A. 291.

Distr. Europe, North Africa, Asia minor, Central Asia, Iran, and Afghanistan.

Trachydium depressum Boiss., Fl. Or. II : 929 (1872).-Rech. f. et Riedl in Symb. Afgh. V : 131 (1963).

Distr. Iran and Afghanistan.

Trachydium puberulum Gilli in Fedde, Rep. Sp. Nov. LXI : 194 (1959).-Rech. f. et Riedl, l. c. 132, Fig. 92.

Distr. Afghanistan.

Vicatia coniifolia DC., Prodr. IV : 243 (1830).-C. B. Clarke in Hooker f., Fl. Brit. Ind. II : 671.-Rech. f. et Riedl in Symb. Afgh. V : 132.

Distr. Afghanistan, West Pakistan, and Himalayas.

Zosimia Gilliana Rech. f. et Riedl in Symb. Afgh. V : 134, Figs. 93, 94 (1963).

Distr. Afghanistan.

SYMPETALAE

Pyrolaceae

Pyrola rotundifolia L., Sp. Pl. 396 (1753).-Kitamura, Fl. Pl. W. Pakistan 113 (1964).

Mt. Noshaq, Qasideh Valley, 3040 m (July 17-20, 1960 R. Y. no. 434).

Distr. Northern Hemisphere.

Primulaceae

Anagallis arvensis L.-K. F. A. 292 errore Anagalis.

Borak, Badakhshan (Sept. 4, 1960 R. Y. nos. 970, 972)-fl. red, between Faizabad and Borak (July 7-8, 1960 R. Y. no. 1188).

Androsace villosa L.-K. F. A. 293.

Mt. Noshaq, Qasideh Valley, 3800-4000 m (Aug. 4, 1960 R. Y. nos. 664, 640, 662).

Cortusa turcestanica A. Los. in Flora et System. III : 239, fig. 1-3, 3-1 (1936).-Wendelbo in Rech. f., Fl. Iran. Primulaceae 26 (1965).

Distr. Pam.-Al., Tianshan, and Afghanistan.

Dionysia balsamea Wendelbo et Rech. f. in Acta Univ. Berg. Series Math. Rerum. Natur. 1963 no. 19 : 7, Fig. 2, 3 e-f (1964).

Distr. Afghanistan.

Dionysia Hedgei Wendelbo, l. c. no. 19 : 18, Fig. 9, 10 (1964).

Distr. Afghanistan.

Dionysia Lindbergii Wendelbo in Botaniska Notiser Vol. CXII : 496, Fig. 1 (1959), l. c. no. 19 : 15 (1964).

Distr. Afghanistan.

Dionysia paradoxa Wendelbo in Bot. Not. Vol. CXII : 497, Figs. 2, 3 (1959), l. c. no. 19 : 6, Fig. 1 (1964).

Dionysia hissarica auct. non Lipsky.-K. F. A. 294.

Distr. Afghanistan (near Sarobi).

Dionysia saponacea Wendelbo et Rech. f., l. c. no. 19 : 10, Fig. 3, a-b (1964).

Distr. Afghanistan.

Dionysia tapetodes Bunge.-K. F. A. 294.

Dionysia denticulata Wendelbo, l. c. no. 19 : 11, Figs. 4, 5 (1964).

Mt. Noshaq, Qasideh Village (June 16-17, 1960 R. Y. no. 1172).

Dionysia trinervia Wendelbo, l. c. no. 19 : 14, Fig. 7 (1964).

Distr. Afghanistan.

Dionysia viscidula Wendelbo, l. c. no. 19 : 20, Fig. 11 (1964).

Distr. Afghanistan.

Primula baldschuanica B. Fedtsch., Consp. Fl. Turkest. V : 6 (1913).-Wendelbo in Rech. f., Fl. Iran. Primulaceae 11 (1965).

Distr. Pam.-Al., Afghanistan.

Primula Duckelmanni Gilli in Fedde, Rep. Sp. Nov. LXII : 22 (1959).

Distr. Afghanistan.

Primula Edelbergii O. Schwz. in Fedde, Rep. LXIV : 85 (1961).

Primula floribunda subsp. *occidentalis* Wendelbo.-K. F. A. 295.

Distr. Afghanistan (Nuristan).

Primula floribunda Wall.-K. F. A. 295.

Distr. Afghanistan (Pushut), W. Pakistan and Himalayas.

Primula nivalis Pallas var. purpurea (Watt) K. F. A. 295.

Mt. Noshaq, Qasideh Valley 4000 m (Aug. 21, 1960 R. Y. no. 704), 3800-4000 m (Aug. 4, 1960 R. Y. no. 646).

Primula sibirica Jacq., Misc. austr. I: 116 (1778).-Kitamura, Fl. Pl. W. Pakistan 115, Figs. 29, 30 (1964).

Primula pamirica Fedrow in Fl. URSS XVIII: 178, 724, Tab. VII, 4 (1952).-S. Ikonnikov, Opred. Rastenii Pamira 191, Tab. 23-4 (1963).

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. nos. 540, 387).

Flowers after anthesis 6-7 mm in diameter, corolla rose.

Distr. From Europe to N. America.

Primula Warshenewskiana B. Fed.-K. F. A. 295.

subsp. **Warshenewskiana**.-Kitamura, Fl. Pl. W. Pakistan 115 (1964).

Ishkashim, Wakhan (Aug. 25-26, 1960 R. Y. no. 811).

Distr. subsp. Pam.-Al., Afghanistan (Wakhan) and W. Pakistan.

Plumbaginaceae

Acantholimon atrofuscum Rech. f. et Koeie in Symb. Afgh. V: 176, Figs. 134, 135 (1963).

Distr. Afghanistan.

Acantholimon curviflorum Bunge, Gattung Acantholimon 57 (1872).-Boiss., Fl. Orient. IV: 847.-Rech. f. et Koeie, l. c. 164 (1963).

Distr. Iran and Afghanistan.

Acantholimon calocephalum Aitch. et Hemsl. subsp. **paghmanicum** Rech. f. et Koeie, l. c. 156 (1963).

Distr. Afghanistan.

Acantholimon diapensioides Boiss.-K. F. A. 296.

Mt. Noshaq 3200 m (Aug. 1, 1960 R. Y. no. 554).

Acantholimon Gillii Rech. f. et Koeie, l. c. 162, Fig. 121 (1963).

Distr. Afghanistan.

Acantholimon glutinosum Rech. f. et Koeie, l. c. 166, Figs. 122, 123 (1963).

Distr. Afghanistan.

Acantholimon grammophyllum Rech. f. et Koeie, l. c. 180, Figs. 140, 141 (1963).

Distr. Afghanistan.

Acantholimon gulistanum Bunge, Gattung Acanth. 67 (1872).-Boiss., Flora Orient. IV: 853.-Rech. f. et Koeie, l. c. 182 (1963).

Distr. Iran and Afghanistan.

Acantholimon hariabense Rech. f. et Koeie, l. c. 170, Figs. 128, 129 (1963).

Distr. Afghanistan.

Acantholimon hyalinum Rech. f. et Koeie, l. c. 168, Figs. 126, 127.

Distr. Afghanistan.

Acantholimon inerme Rech. f. et Koeie, l. c. 151, Figs. 107, 108 (1963).

Distr. Afghanistan.

Acantholimon kandaharense Rech. f. et Koeie, l. c. 166, Figs. 124, 125 (1963).

Distr. Afghanistan.

Acantholimon Koelzii Rech. f. et Koeie, l. c. 157, Figs. 115, 116 (1963).

Distr. Afghanistan.

Acantholimon lycopodioides Boiss. ex DC., Prodr. XII: 632 (1848).-Lincz. in Fl. URSS XVIII: 314.-Rech. f. et Koeie, l. c. 156.

Distr. Afghanistan, Pam.-Al., W. Pakistan, Kashmir, and Kashgar.

Acantholimon macranthum Rech. f. et Koeie, l. c. 171, Figs. 130, 131 (1963).

Distr. Afghanistan.

subsp. **dubium** Rech. f. et Koeie, l. c. 173 (1963).

Distr. Afghanistan.

Acantholimon Munroanum Aitch. et Hemsl.-K. F. A. 298.

Mt. Noshaq, 3040 m (July 17-20, 1960 R. Y. n. 442).

Acantholimon Nikitinii Lincz. in Fl. URSS XVIII: 368, 742, Tab. XVIII, figs 3, 3a (1952).

Distr. Afghanistan, Iran and Gorn.-Turkm.

Acantholimon revolutum Rech. f. et Koeie, l. c. 153, Fig. 109, 110 (1963).

Distr. Afghanistan.

Acantholimon saxifragaefolium Rech. f. et Koeie, l. c. 154, Fig. 111, 112 (1963).

Distr. Afghanistan.

Acantholimon solidum Rech. f. et Koeie, l. c. 159, Fig. 117, 118 (1963).

Distr. Afghanistan.

Acantholimon stenorhaphium Rech. f. et Koeie, l. c. 177, Fig., 136, 137 (1963).

Distr. Afghanistan.

Acantholimon tricolor Rech. f. et Koeie, l. c. 162, Fig. 119, 120 (1963).

Distr. Afghanistan.

Acantholimon xanthacanthum Rech. f. et Koeie, l. c. 173, Figs. 132, 133 (1963).

Distr. Afghanistan.

Cephalorrhizum oopodum M. Pop. ex Korovin.-K. F. A. 299.

Limonium coelicolor Rech. f. in Symb. Afgh. V: 136, Figs. 95, 96 (1963).

Chaetolimon sogdianum Lincz. in Tr. Tadz. Bazvi An SSSR VIII: 587 (1940), in Fl. URSS XVIII: 373 (1952).-Rech. f. et Koeie, l. c. 182 (1963).

Distr. Pam.-Al. and Afghanistan.

Psylliostachys hymenostegia Rech. f. in Symb. Afgh. V: 143, Figs. 103, 104 (1963).

Distr. Afghanistan.

Psylliostachys Koelzii Rech. f., l. c. 145, Figs. 105, 106 (1963).

Distr. Afghanistan.

Psylliostachys leptostachya (Boiss.) Roshk. in Fl. URSS XVIII: 468 (1952).-Rech. f. in Symb. Afgh. V: 139, Figs. 97, 98. *Statice leptostachya* Boiss.

Distr. Central Asia, Iran and Afghanistan.

Psylliostachys spicata (Willd.) Nevski.-*Limonium spicatum* (Willd.) O. Kuntze.-K. F. A. 300.

Psylliostachys Suworowii (Regel) Roshk. in Fl. URSS XVIII: 469, Tab. XXIII, fig. 3, 3a (1952).-Rech. f., l. c. 143 (1963).

Distr. Central Asia, Iran and Afghanistan.

Psylliostachys Volkii Rech. f., l. c. 140, Figs. 99, 100, 101, 102 (1963).

Distr. Afghanistan.

Gentianaceae

Centaurium pulchellum (Swartz) Druce.-K. F. A. 303.

Zebak, Badakhshan (July 15, 1960 R. Y. no. 363)-depauperated form.

Gentiana asyneumoides (Riedl) Kitamura comb. nov.

Gentianella asyneumoides H. Riedl in Ann. Naturh. Mus. Wien LXV: 33, Taf. 1-3 (1962).

Distr. Afghanistan (N. E.).

Gentiana longicarpa Gilli in Fedde, Rep. Sp. Nov. XLIII: 327 (1960), cum f. macrocalyx Gilli.

Distr. Afghanistan.

Gentiana stricta Klotzsch, Bot. Ergeb. Prinz. Wald. Preus. t. 67 (1862).-Kitamura, Fl. Pl. W. Pakistan 118 (1964).

Gentiana Vvedenskyi Grossh. in Fl. URSS XVIII: 597 (1952).

G. detonsa auct. non Fries.-Clarke in Fl. Brit. Ind. IV: 118.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 394), Qasideh Valley 3800-4000 m (Aug. 4, 1960 R. Y. no. 602), Ishkashim, (Aug. 25-26, 1960 R. Y. no. 832).

Distr. Pam.-Al., Tianshan, Dz.-Kashg, Afghanistan (Wakhan), W. Pakistan, Kashmir, and Mongolia.

Asclepiadaceae

Cynanchum canescens (Willd.) K. Schum.-K. F. A. 308.

Cynanchum cabulicum Bornm.-K. F. A. 308.

Vincetoxicum darvasicum B. Fedtsch., Consp. Fl. Turkest. V: 15 (1913).

Antitoxicum darvasicum (B. Fedtsch.) Pobed. in Fl. URSS XVIII: 693, Tab. XXXIII, fig. 4 (1952).

Between Borak and Faizabad (Sept. 15, 1960 R. Y. no. 1308)-fr., between Kabul and Pagman (June 17, 1960 R. Y. no. 23).

Distr. Asia minor, Iraq, Iran, Afghanistan, Pam.-Al. and Himalayas (from Kashmir to Bhutan).

Cynanchum canescens is widely distributed and is differentiated into geographical races slightly different each other by the shape of leaves.

The Himalayan race (*C. glaucum*) has leaves, elliptic or oblong-ovate, round or broadly cuneate at the base, obtuse or acute at the apex and shortly petiolate (petiole 3-5 mm long). The flowers are few or many, and dirty yellowish green in colour. The diameter of flowers, 7-9 mm.

The race of Afghanistan and Pamir (*V. darvasicum*, *C. cabulicum*) has leaves, ovate-triangular, round or subcordate at the base, acute or acuminate at the apex, and rather longly petiolate (5-10 mm long). The flowers are few or many, and dirty yellowish green in colour.

The diameter of flowers, 6-8 mm.

Convolvulaceae

Convolvulus arvensis L.-K. F. A. 309.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 381), Borak, Badakhshan (July 12-13, 1960 R. Y. no. 249), Ishkashim (Aug. 25-26, 1960 R. Y. no. 856). between Kabul and Pagman (June 17, 1960 R. Y. no. 1167).

Convolvulus leiocalycinus Boiss., Diag. Ser. I, VII: 28 (1848).-Rech. f., Fl. Iran. Convolvulaceace 8 (1963).

Distr. Iran, Afghanistan and W. Pakistan.

Convolvulus hamadae (Vued.) V. Petr. in Bull. Soc. Nat. Mosc. n. s. XLIV: 134 (1935).-Rech. f., l. c. 10.

Distr. Iran, Turkomania, Afghanistan, and Pam.-Al.

Convolvulus pyrrhotrichus Boiss. *C. gonocladus* subsp. *pyrrhotrichus* Rech. f.

Cuscuta approximata Babingt.-K. F. A. 312.

var. **urceolata** (Kunze) Yunck. in Mém. Torrey Club. XVIII: 297 (1932).-Yuncker et Rech. f. in Flora Iran. Cuscutaceae 15 (1964).

Distr. var. Mediterranean Region, and Southwest Asia.

var. **schiraziana** (Boiss.) Yunck., l. c. XVIII: 298 (1932).-Yuncker et Rech. f., l. c. 15 (1964).

Distr. var. Mediterranean Region, and Southwest Asia.

Cuscuta babylonica Auch. et Choisy in Mém. Soc. Phys. Genève IX: 270 (1841).-Yuncker et Rech. f., l. c. 9 (1964).

Distr. Iraq, Iran, Turkomania, and Afghanistan.

Cuscuta capitata Roxb., Hort. Beng. 12 (1814).-Yuncker et Rech. f. l. c. 7 (1964).

Distr. Central Asia and Himalayas.

Cuscuta Kotschyana Boiss., Diagn. Pl. Or. Nov. Ser. I, VII: 27 (1846).-Yuncker et Rech. f., l. c. 7 (1964).

Distr. Iran, Afghanistan and W. Pakistan.

Cuscuta kurdica Engelm. in Trans. Ac. Sci. St. Louis I: 470 (1859).-Yuncker et Rech. f., l. c. 10 (1964).

Distr. Iraq, Iran, and Afghanistan.

Cuscuta planiflora Ten., Fl. Napolit. III: 250 (1824-29).-Yuncker et Rech. f., l. c. 13 (1964).

Distr. Mediterranean Region, Iran, and Afghanistan.

Cuscuta pulchella Engelm. in Trans. Ac. Sci. St. Louis I: 472 (1859).-Yuncker et Rech. f., l. c. 8 (1964).

C. pulchella Engelm. var. *affghanica* Engelm.-K. F. A. 313.

Distr. Iraq and Afghanistan.

Cuscuta reflexa Roxb.-K. F. A. 313.

Cuscuta gigantea auct. non Griffith.-Grigor in Fl. URSS XIX: 75.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 969, 923).

Distr. Pam.-Al., Afghanistan, India and Malaya.

Cuscuta pamirica Batk. may be a syn. of C. gigantea Griffith.

Borraginaceae

Adenocaryum anchusoides (Lindley) Brand.-K. F. A. 313.

Lindelofia aspera Rech. f. in Ann. Naturh. Mus. Wien 58: 48 (1951).

Lindelofia anchusoides Lehm. in Hamb. Gartenz. VI: 352 (1850).-Riedl in Symb. Afgh. V: 201 (1963).

Lindelofia longipedicellata Riedl, l. c. 199, Fig. 152 (1963).

Lindelofia campanulata Riedl., l. c. 198.

Ishkashim (July 16, 1960 R. Y. no. 383)-fl., (Aug. 29-31, 1960 R. Y. no. 938)-fl. et fr., Borak (Aug. 12-13, 1960 R. Y. nos. 279, 280)-fr., between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1217).

This species is very variable and has large flowers. The length of the pedicel is also variable. The surface of the nutlets has usually short bristles, but sometimes long bristles.

Arnebia decumbens (Vent.) Coss. et Kral. in Bull. Soc. Bot. France IV: 398, 402 (1857).-Popov in Fl. URSS XIX: 180 (1953).-Riedl in Österr. Bot. Zeit. CIX: 61 (1962), Symb. Afgh. V: 240 (1963).

Distr. Europe, Altai, Caucasus, Central Asia, Iran, Afghanistan, Dz.-Kashg. and Mongolia.

Arnebia fimbriopetala Stocks in Hooker, Kew Journ. III: 180 (1851).-Riedl in Österr. Bot. Zeit. CIX: 60 (1962), l. c. 241 (1963).

Distr. Iran, Afghanistan and W. Pakistan.

Arnebia grandiflora (Trautv.) M. Pop. in Lapin, Opred. Rast. Tashkentsk. Oazisa 342 (1938), Fl. URSS XIX: 179 (1953).-Riedl in Österr. Bot. Zeit. CIX: 67 (1962), l. c. 244 (1963).

Distr. Dz.-Tarb., Tianshan, Pam.-Al., Syr-Dar. and Afghanistan.

Arnebia simulatrix Riedl in Österr. Bot. Zeitschr. CIX: 70 (1962), in Symb.

Afgh. V : 243, Fig. 192. (1963).

Distr. Afghanistan.

Bothriospermum tenellum Fischer et Meyer, Index Sem. Horti Petrop. 23 (1835).-Popov in Fl. URSS XIX : 236 (1953).-Riedl in Österr. Bot. Zeit. CX : 512 (1963), l. c. 224 (1963).

Distr. Afghanistan, Pam.-Al., Ussur., Udsk., Himalayas, China and Japan.

Cynoglossum glochidiatum Benth.-K. F. A. 314.

Borak (July 7, 1960 R. Y. no. 326)-fl., (July 12-13, 1960 R. Y. nos. 283, 284, 288)-fl., fr., (Aug. 12, 1960 R. Y. nos. 255, 291), between Kabul and Pagman (June 17, 1960 R. Y. nos. 22, 1159)-fl.

Cynoglossum nervosum Bentham ex C. B. Clarke, in Fl. Brit. Ind. IV : 158 (1883).-Riedl, l. c. 197 (1963).

Distr. Afghanistan (Nuristan sec Riedl) and Himalayas (from Kashmir to Kumaon).

Cynoglossum zeylanicum Thunb. ex Lehm. in Neue Schrift. Naturf. Ges. Halle III, II : 20 (1817).-Riedl, l. c, 197.

Distr. Afghanistan, Himalayas, India, Burma, China, South-East Asia, and Japan.

Echioides longiflorum (C. Koch) Johnston in Journ. Arn. Arb. XXXV : 58 (1954).-Riedl, l. c. 248.

Macrotomia echioides (L.) Boiss., Fl. Orient. IV : 211 (1879).-Popov in Fl. URSS XIX : 172 (1953).

Distr. Asia minor, Caucasus, Arm.-Kurd., Iran, and Afghanistan.

Echium italicum L., Sp. Pl. 139 (1753).-Riedl in Symb. Afgh. V : 248.

Borak (June 12-13, 1960 R. Y. no. 220)-fl., (Sept. 4, 1960 R. Y. no. 1019)-fr., Furmular (Sept. 5, 1960 R. Y. no. 1031).

Distr. Europe, Caucasus, Asia minor, Central Asia, Iran, and Afghanistan.

Eritrichium canum (Benth.) Kitamura, Fl. Pl. W. Pakistan 121 (1963). *Echinospermum canum* Benth. (1836). *Eritrichium strictum* Decne. (1884). *E. afghanicum* Rech. f. in Ann. Naturhistor. Mus. Wien LXXVIII : 531 (1951).-Riedl in Symb. Afgh. V : 222, Figs. 171, 172.

E. rupestre Bunge var. *pectinata* Brand.-K. F. A. 315.

Distr. Afghanistan, W. Pakistan and Himalayas (from Kashmir to Nepal).

Eritrichium spathulatum (Benth.) Clarke in Hooker f., Fl. Brit. Ind. IV : 164 (1883).

Echinospermum spathulatum Benth. in Royle, Ill. Bot. Himal. 306 (1836).

Eritrichium rupestre Bunge var. *pectinatum* subv. *spathulatum* Brand in Pflanzenreich, Heft 97 : 193 (1931).

Mt. Noshaq, Qasideh Valley, 3040 m (July 26, 1960 R. Y. nos. 497, 499).

Distr. Afghanistan, W. Pakistan and Himalayas (Eastwards to Kumaon).

The leaves are spatulate or oblanceolate and patently ciliate on margin. This may be E. nanum ssp. villosum Brand according to Riedl in Symb.

Afgh. V : 222.

Heliotropium bacciferum Forsk., Fl. Aeg.-Arab. 38 (1775).-Burtt in Kew Bull. 1948: 138.-Riedl in Symb. Afgh. V : 184 (1963).

Heliotropium persicum auct. non Lam.-K. F. A. 316.

H. undulatum Vahl. *H. afghanicum* Boiss.

Heliotropium bucharicum B. Fedtsch. in Bull. Jard. Bot. Pétersb. XV, 1: 1, Tab. 1 (1915).-Popov in Fl. URSS XIX : 132.-Riedl in Symb. Afgh. V : 184, Fig. 144 (1963).

Distr. Pam.-Al. and Afghanistan.

Heliotropium dicricophorum Rech. f. et Riedl in Symb. Afgh. V : 186, Fig. 142 (1963).

Distr. Afghanistan.

Heliotropium fragiliferum Rech. f. in Symb. Afgh. V : 186, Fig. 143 (1963).

Distr. Afghanistan.

Heliotropium lasiocarpum Fischer et Meyer.-K. F. A. 316.

Borak (Sept. 13, 1960 R. Y. nos. 1123, 1148)-fl. and fr., Furmular (Sept. 5, 1960 R. Y. no. 1039)-fl.

Heliotropium longicalyx Rech. f. in Ann. Naturhist. Mus. Wien LVIII: 47 (1951), in Symb. Afgh. V : 189, Fig. 147 (1963).

Distr. Afghanistan.

Heliotropium luteo-viride Rech. f. et Riedl in Symb. Afgh. V : 191, Fig. 148.

Distr. Afghanistan.

Heliotropium macrolimbe H. Riedl in Symb. Afgh. V : 192: Fig. 149 (1963).

Distr. Afghanistan.

Heliotropium taftanum Rech. f., Aell. et Esfand. in Ann. Natur. Mus. Wien LVIII: 46 (1951), in Symb. Afgh. V : 196 (1963).

Distr. Iran and Afghanistan.

Hetrocaryum laevigatum (Kar. et Kir.) A. DC., Prodr. X : 145 (1846).-Popov in Fl. URSS: 539, Tab. XXVI, Fig. 1 (1953).-Riedl in Symb. Afgh. V : 221 (1963).

Distr. Central Asia, Iran and Afghanistan.

Hetrocaryum rigidum A. DC., Prodr. X : 145 (1846).-Popov, l. c. 540, Tab. XXVI, Fig. 3 (1953).-Riedl, l. c. 221 (1963).

Echinospermum mininum auct. non Lehm., Clarke, F. B. I. IV : 162.

Distr. Caucasus, Central Asia, Iran, Afghanistan, W. Pakistan, and Kashmir.

Heterocaryum Szovitsianum (Fischer et Mey.) A. DC., l. c. 145 (1845).-Popov, l. c. 546, Tab. XXVI, Fig. 3 (1953).-Riedl, l. c. 221 (1963).

Heterocaryum echinophorum Brand.-K. F. A. 317, excl. syn. *E. minimo* et *Myosotis echinophoram* et Distriv.

Distr. Caucasus, Tianshan, Pam.-Al., Gorn.-Turkm., Iran, and Afghanistan.

Lappula microcarpa (Ledeb.) Gürke.-K. F. A. 318.

Mt. Noshaq 3040 m (July 26, 1960 R. Y. no. 512).

Lappula Redowskii (Hornem.) Green.-K. F. A. 318.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 771, 791).

Lappula sinaica (DC.) Ascher. et Schweinf.-K. F. A. 318.

Mt. Noshaq 3200 m (Aug. 1, 1960 R. Y. no. 599).

Lindelofia angustifolia (Schrenk) Brand in Pflanzenreich Heft 78: 87 (1921).-Kitamura, Fl. Pl. W. Pakistan 122.

Solenanthus angustifolius Schrenk, ex Fischer et Mey. in Bull. Acad. Sc. St. Pétersb. X: 353 (1842), Enum. Pl. Schrenk II: 28 (1842).

Lindelofia Benthamii Hooker f.

Cynoglossum stylosum Kar. et Kir. in Bull. Soc. Nat. Mosc. XV: 409 (1842).

Solenanthus nigricans Schrenk ex Fischer et Mey., Enum. Pl. Schrenk II: 29 (Oct. 1842).

Lindelofia stylosa (Kar. et Kir.) Brand, l. c. 85 (1921).-Popov in Fl. URSS XIX: 633, Tab. XXXVI, Fig. 1.-Riedl in Symb. Afgh. V: 198 (1963).

Mt. Noshaq 3200 m (Aug. 1, 1960 R. Y. no. 515).

Distr. Tarbagatai, Pam.-Al., Afghanistan, Karakoram, and Kashmir.

Fischer and Meyer in their Enumeration quoted both Solenanthus angustifolius and Cynoglossum stylosum Kar. et Kir. in Bull. Soc. Nat. Mosc. XV: 409 (1842).

Lindelofia stenosiphon Rech. f. in Ann. Natur. Mus. Wien LVIII: 49 (1951).

Distr. Afghanistan.

This species was described without fruit, and the generic position is doubtful. From the description this may be L. angustifolia.

Lithospermum arvense L.-K. F. A. 319.

Borak (Sept. 12, 13, 1960 R. Y. nos. 1106, 1107), between Zabak and Borak (Sept. 3, 1960 R. Y. no. 1226).

Lithospermum officinale L.-K. F. A. 319.

Borak (July 12, 13, 1960 R. Y. no. 230), (Sept. 12, 1960 R. Y. no. 1141).

Lycopsis orientalis L.-K. F. A. 319. *Anchusa orientalis* Reichb.

Mt. Noshaq (July 16, 17, 1960 R. Y. nos. 376, 378, 1180), Qasideh Village (Aug. 24, 1960 R. Y. no. 756), between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1211), Ishkashim (Aug. 29-31, 1960 R. Y. nos. 787, 941), (Aug. 25, 26, 1960 R. Y. nos. 826, 827, 855).

Macrotomia euchromon (Royle) Pauls. var. **angustifolia** Kitamura var. nov.

Caulis florifer 15-20 cm altus. Folia radicalia linearia 6-9 cm longa 3-4 mm lata apice obtusa, pilis albis adpressis brevibus et pilis longis apice acutis dense vestita, folia caulina linearia apice obtusa basi semiamplexicaulia 3-5 cm longa medio 3-4 mm lata. Calyx 18-20 mm longus, sepala linearilanceolata 16-18 mm longa. Corolla 12 mm longa, 5 mm lata, extus praecipue superne dense hirsuta et glandulosa, lobis rotundatis 2 mm longis.

Mt. Noshaq, Qasideh Valley, Wakhan 4000 m (Aug. 21, 1960 R. Y. Typus no. 734-fl. et fr., no. 724), 3040 m (July 26, 1960 R. Y. no. 493)-fl.

This variety differs from var. euchromon by distinctly narrower leaves. The corollas are more densely hairy.

Macrotomia inconspicua (Hemsl. et Lace) Kitamura, F. A. 321.

Arnebia argyrea Rech. f. in Ann. Natur. Mus. Wien LVIII: 59 (1951).

Lithospermum inconspicuum Johnston in Journ. Arnold. Arb. XXXIV : 12 (1953).

Arnebia inconspicua Hemsl. et Lace (1891).-Riedl in Symb. Afgh. V : 241, Figs. 187, 188, 189 (1963).

Macrotomia Linderbergiana Rech. f. in Ann. Natur. Mus. Wien LVIII: 58 (1951).

Arnebia Linderbergiana Johnston in Journ. Arnold. Arb. XXXV : 56 (1954).-Riedl, l. c. 241, Fig. 190 (1963).

Distr. Afghanistan.

Mattiastrum acrocladum Rech. f. et Riedl in Symb. Afgh. V : 207.

Distr. Afghanistan (Nuristan).

Mattiastrum Bungei (Boiss.) Rech. f. et Riedl in Symb. Afgh. V : 209, Fig. 160 (1963). *Echinospermum Bungei* Boiss. *Paracaryum Bungei* (Boiss.) Brand.

Distr. Iran and Afghanistan.

Mattiastrum heratense Rech. f. et Riedl, l. c. 210, Fig. 161. (1963).

Distr. Afghanistan.

Mattiastrum himalayense (Klotzsch) Brand in Fedde, Rep. XIV : 156 (1915), in Pflanzenreich Heft 78 : 65 (1921).-Riedl, l. c. 213. *Paracharyum himalayense* (Klotzsch) Clarke.

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y.), Borak (Sept. 12, 1960 R. Y. no. 1136).

Distr. Pam.-Al., Afghanistan and Kashmir.

Mattiastrum Honigbergeri Rech. f. in Ann. Natur. Mus. Wien LV : 14 (1946). -Riedl, Symb. Afgh. V : 213, Fig. 164.

Distr. Afghanistan and W. Pakistan.

Mattiastrum lactiflorum Rech. f. et Riedl, l. c. 214, Fig. 165 (1963).

Distr. Afghanistan.

Mattiastrum multicaule Rech. f. et Riedl, l. c. 216, Fig. 166.

Distr. Afghanistan.

Mattiastrum tibeticum (C. B. Clarke) Brand in Fedde, Rep. XIV : 156 (1915), in Pflanzenreich Heft 78 : 66 (1921).-Riedl, l. c. 216, Fig. 67 (1963).

Paracaryum tibeticum Clarke.

Distr. Afghanistan (Nuristan) and Kashmir.

Mertensia Edelbergii Rech. f. et Riedl in Symb. Afgh. V : 230, Fig. 176.

Distr. Afghanistan (Nuristan).

Mertensia exserta Johnston in Journ. Arn. Arb. XXXVII : 305 (1956).

Moltkia parviflora (Decne.) C. B. Clarke.-K. F. A. 322.

Craniospermum parviflorum Decne. in Jacquemont, Voy. Bot. 126, t. 130 (1844).

Mertensia lindelofioides Rech. f. et Riedl, l. c. 233, Fig. 179 (1963).

Distr. Afghanistan.

Mertensia primuloides (Decne.) C. B. Clarke in Hooker f., Fl. Brit. Ind. IV : 170 (1883).-Riedl, l. c. 235, Figs. 181, 182, 184 (1963).

Eritrichium primuloides Decne. in Jacquemont, Voy. Bot. 123, t. 128 (1844).

Mertensia nuristanica Rech. f. in Ann. Naturh. Mus. Wien LVIII : 56 (1951).

Distr. W. Pakistan and Afghanistan (Nuristan).

Myosotis palustris Lamk.-K. F. A. 322.

Borak, Badakhshan (Aug. 12, 1860 R. Y. no. 356).

Myosotis refracta Boiss., Voyage Espan. 433 (1842).-Popov in Fl. URSS XIX : 384 (1953).-Riedl in Symb. Afgh. V : 227 (1963).

Distr. Europe, Iran, Gorn.-Turkm., Tianshan, Pam.-Al., and Afghanistan.

Myosotis suaveolens Wald. et Kit. in Willd., Enum. Pl. Hort. Berol. 176 (1809).-Popov, l. c. 376.-Riedl, l. c. 227.

Distr. Europe, Caucasus, Siberia, Central Asia and Afghanistan.

Nonnea caspica (Willd.) G. Don.-K. F. A. 323.

Kunduz (Sept. 17, 1960 R. Y. no. 1156), Kandahar (June 8, 1955 S. K.) misplaced under N. pulla in K. F. A. 323.

Nonnea kandaharensis Riedl in Symb. Afgh. V : 226, Fig. 173 (1963).

Distr. Afghanistan.

This species seems to be closely related to N. caspica.

Onosma bulbotrichum A. DC., Prodr. X : 64 (1846).-Boiss., Fl. Orient. IV : 184.-Riedl, l. c. 247.

Distr. Iran and Afghanistan.

Onosma limitaneum Johnston var. **majus** Johnston in Journ. Arnold Arboretum LI : 354 (1951).-Riedl. l. c. 247 (1963).

Distr. Afghanistan and W. Pakistan.

var. **parviflorum** Johnston, l. c. 354 (1951).

Distr. Afghanistan and Iran.

Paracaryum calathicarpum (Stocks) Boiss., Fl. Orient. IV : 254 (1879).-Riedl, l. c. 203, Fig. 155 (1963).

Distr. Afghanistan and W. Pakistan (Belutschistan).

Paracaryum platycalyx Riedl in Österr. Bot. Zeit. CX : 535 (1963), l. c. 204, Fig. 156 (1963).

Distr. Afghanistan.

Rindera cyclodonta Bunge in Mém. Acad. Pétersb. Sav. Étrang. VII : 415 (1854).-Popov in Fl. URSS XIX : 580 (1953).-Riedl, l. c. 216.

Distr. Central Asia, Iran and Afghanistan.

Rindera Neubaueri Rech. f. et Riedl in Symb. Afgh. V : 216, Figs. 169, 170, 234 (1963).

Moltkia Neubaueri Rech. f. in Ann. Natur. Mus. Wien LVIII : 57 (1951).

Distr. Afghanistan.

Rochelia Bungei Trautv. in Acta Horti Petrop. IX, 2: 462 (1886).-Popov in Fl. URSS XIX: 554.-Riedl in Symb. Afgh. V: 249.

Distr. Central Asia, Iran and Afghanistan.

Rochelia disperma (L. f.) C. Koch in Linnaea 1849: 649.-Popov, l. c. 551 (1953).-Riedl, l. c. 249 (1963).

Distr. Caucasus, Arum.-Kurd., Gorn.-Turkm., Iran and Afghanistan.

Rochelia peduncularis Boiss., Diag. Sér. I, VII: 35 (1846).-Popov, l. c. 561, Tab. XXVII, fig. 2 (1953).-Riedl, l. c. 250 (1963).

Distr. Tianshan, Pam.-Al., Iran and Afghanistan.

Rocheria pygmaea Rech. f. et Riedl in Symb. Afgh. V: 250, Fig. 195 (1963).

Distr. Afghanistan.

Solenanthus circinnatus Ledeb.-K. F. A. 326. errore *circinatus*.

Mt. Noshaq, Qasideh Valley 3040 m (July 17-20, 1960 R. Y. no. 468).

Solenanthus stamineus (Desf.) Wettst. in Denkschrift K. K. Acad. Wissenschaft Wien L, 2: 88 (1885).-Popov, l. c. 652 (1963).-Riedl, l. c. 197 (1963).

Distr. Caucasus, Pam.-Al., Arm.-Kurd., Asia minor, Iran and Afghanistan.

Solenanthus turkestanicus (Regel et Smirnow) Kusn. in Mat. Fl. Cauc. IV, 2: 141 (1913).-Popov, l. c. 644, Tab. XXXVI, fig. 2 (1953).-Riedl, l. c. 198 (1963).

Distr. Pam.-Al., Syr-Dar,. Gorn.-Turkm., Iran and Afghanistan.

Trichodesma molle DC.-K. F. A. 327.

Istalif (June 25, 1960 R. Y. nos. 77, 84), Kunduz (Sept. 17, 1960 R. Y. no. 1157), between Faizabad and Borak (July 7-8, 1960 R. Y. no. 1187).

Trichodesma Griffithii Planch. ex Riedl, l. c. 195 (1963).

Trichodesma molle DC. var. *Griffithii* (Brand) Kitamura, F. A. 327.

T. incanum subsp. *molle* var. *Griffithii* (Planch.) Brand in Pflanzenreich Heft 78: 371 (1921).

Verbenaceae

Verbena officinalis L.-K. F. A. 327.

Ishkashim (July 11, 1960 R. Y. no. 281), Borak (Sept. 4, 1960 R. Y. no. 790).

Vitex Agnus-castus L.-K. F. A. 327.

V. Pseudo-negundo (Hsskn.) Hand. Mzt.

Labiatae by G. Murata

Clinopodium vulgare L.-K. F. A. 328 (1960).

Between Kabul and Pagman (June 17, 1960 R. Yosii nos. 29, 39).

Distr. Europe, North Africa, W. & N. Asia, Iran, Afghanistan, and Himalayas.

Elsholtzia densa Benth.-Kitamura, Fl. Pl. West Pakistan 126 (1964).

Ishkashim (Aug. 29-30, 1960 R. Yosii nos. 788, 789), same loc. (Aug. 25-26, 1960 R. Yosii nos. 846, 850), Mt. Noshaq, Qasideh Village (Jul. 16-17, 1960 R. Yosii no. 596).

Distr. Manshuria (Jehol), China, Himalayas (from Kashmir to Nepal), Karakoram, Afghanistan (Wakhan), and Pamir.

Kudrjashevia allotricha Pojark. in Not. Syst. Herb. Inst. Bot. Nom. Komar. Acad. Sci. URSS. XV : 277 (1953) et Fl. URSS XX : 475 (1954).

Mt. Noshaq, Qasideh Village (Jul. 16-17, 1960 R. Yosii no. 408), same loc. (Jul. 26, 1960 R. Yosii no. 527).

Distr. Pamir and Afghanistan.

Lagochilus nuristanicus Rech. f. et Ederb.-K. F. A. 331 (1960).

Badakhshan : between Kotal-i-Bonarat and Doab (Sept. 6, 1960 R. Yosii no. 1045).

Lamium amplexicaule L.-K. F. A. 331.

Borak, Badakhshan (Sept. 13, 1960 R. Yosii no 1121), Ishkashim (Aug. 29-31, 1960 R. Yosii nos. 760, 819), Mt. Noshaq, Qasideh Village (Jul. 16-17, 1960 R. Yosii no. 525).

Lycopus europaeus L.-K. F. A. 333.

Borak (Sept. 4, 1960 R. Yosii no. 1003).

Marrubium duabense Murata in Acta Phytotax. Geobot. XXII : (1966). **Fig. 3.** Planta perennis 60-80 cm alta. Caules simplices erecti quadranguli inferiore 5-6 mm crassi subfloccoso-tomentosi, parce ramosi, internodiis 5-10 cm longis pilis simplicibus tomentosis. Folia caulina petiolata, lamina ovata 5-8 cm longa irregulariter serratodentata apice obtusa basi cordata utrinque pilis longis adpressis sparse vestita, petiolis 1-3 cm longis. Folia floralia breviter petiolata deflexsa ovato-oblonga basi truncata vel cuneata. Verticillastri multiflori remoti. Bracteae subulatae calyce aequilongae longe pilosae apice spinosae. Calyx 9 mm longus pilosus, nervis subprominulis, dentibus 6 subulatis apice acuminatis spinosis 1-2.5 mm longis. Corolla 8-9 mm longa tubo calyce breviore inferne glabro superne breviter piloso, intus annulatim piloso, labio superiore quam labio inferiore longiore, bifido, lobis apice acutis, labio inferiore trifido, lobo medio late ovato, lobis lateralibus oblongo-ovatis. Stamina anteriora posterioribus paulo longiora. Nuculae ignotae.

Hab. Afghanistan : between Bulola and Duab (June 25, 1955 S. Kitamura)-Typus in Herb. KYO.

Mentha longifolia (L.) Huds.-K. F. A. 335.

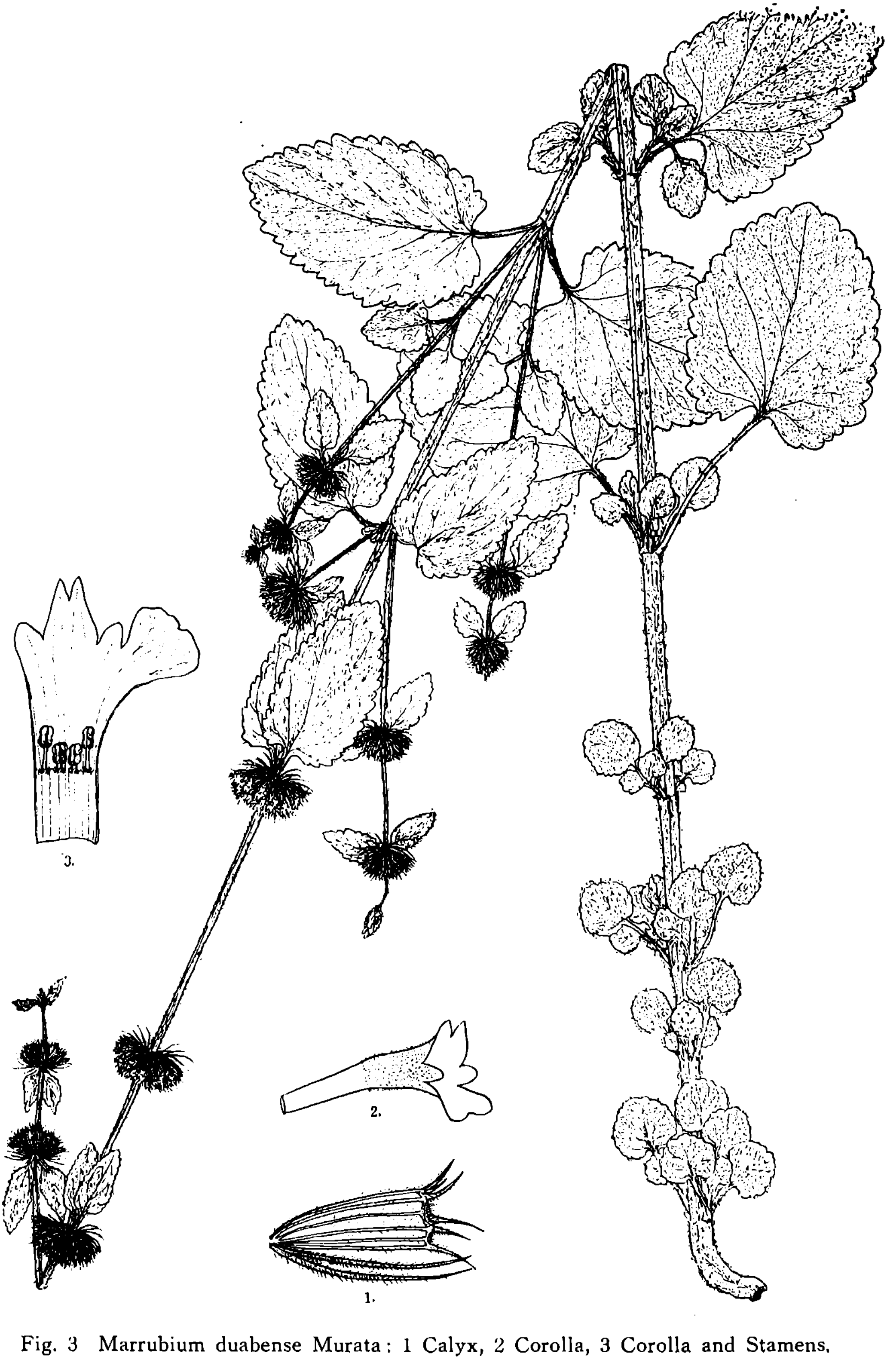

Fig. 3 Marrubium duabense Murata: 1 Calyx, 2 Corolla, 3 Corolla and Stamens.

Ishkashim (Aug. 29-31, 1960 R. Yosii nos. 986, 901), Borak (Sept. 12-13, 1960 R. Yosii nos. 250, 254, 274, 1109, 1142), between Zebak and Borak (Sept. 3, 1960 R. Yosii no. 1205).

Nepata Clarkei Hook. f.-K. F. A. 336.

Nuristan: between Kushimaikot and Pushuki (Aug. 3, 1955 S. Kitamura), Shabul Gul (Aug. 6, 1955 S. Kitamura).

Nepeta glutinosa Benth.-K. F. A. 337.

Mt. Noshaq, Qasideh Valley (Jul. 26, 1960 R. Yosii no. 503), (Jul. 17-20, 1960 R. Yosii no. 457), 3200 m (Aug. 1, 1960 R. Yosii no. 563).

Nepeta laevigata (D. Don) Hand.-Mzt.-K. F. A. 339.

N. nuristanica Murata in Acta Phytotax. Geobot. XVII : 74 (1958) et in Kitamura, F. A. 341 f. 90 (1960), syn. nov.

Pakistan: Nuthiagali (Oct. 13, 1957 S. Monji).

Nepeta longibracteata Benth.-K. F. A. 339.

Mt. Noshaq, Qasideh Valley, (Aug. 10-15, 1960 R. Yosii no. 671).

Nepeta minjanensis Rech. f.-K. F. A. 341.

Mt. Noshaq, Qasideh Valley, (Aug. 21, 1960 R. Yosii nos. 684, 714), (Aug. 4, 1960 R. Yosii no. 985).

Nepeta podostachys Benth.-K. F. A. 341.

Ishkashim (Aug. 29-31, 1960 R. Yosii no. 794), Mt. Noshaq, Qasideh Valley (Aug. 1, 1960 R. Yosii no. 572).

Nepeta spathulifera Benth.-K. F. A. 342.

Mt. Noshaq, Qasideh Valley (Aug. 4, 1960 R. Yosii no. 658), (Aug. 20, 1960 R. Yosii no. 680).

Salvia bucharica M. Pop.-K. F. A. 344 (1960).

Istalif (June 25, 1960 R. Yosii nos. 72, 87, 75, 76).

Salvia glutinosa L. subsp. nubicola (Wall. ex Sweet) Murata, comb. nov.

S. nubicola Wall. ex Sweet, Brit. Fl. Gard. 2 t. 140 (1827).-Benth. in Wall., Pl. As. Rar. I : 68 (1830) et Lab. Gen. et Sp. 219 (1833).-I. C. Hedge in Notes Roy. Bot. Gard. Edinb. XXIII : 206 (1961). *S. glutinosa* (non L.) Hook. f., Fl. Brit. Ind. IV : 635 (1885).-P. Stibal in Fedde, Repert. XXXIX : 183 (1936).-Mukerjee in Rec. Bot. Surv. Ind. XIV : 113 (1940).-Rech. f., Symb. Afgh. I : 65 (1954).-Murata in Kitamura, Pl. W. Pakistan & Afgh. 129 (1964). *S. glutinosa* var. *nubicola* (Wall.) Briq., Pfl.-Fam. IV-3a : 274 (1897).

Distr. Afghanistan (Nuristan), W. Pakistan, Kashmir, Tibet, Nepal, Sikkim, and Bhutan.

Salvia pterocalyx I. C. Hedge in Notes Roy. Bot. Gard. Edinb. XXIII : 163, Pl. 11 (1960).

Between Pulikhumri and Haibak (June 27, 1955 S. Kitamura).

Distr. Afghanistan.

Salvia tetrodonta I. C. Hedge in Notes Roy. Bot. Gard. Edinb. XXIII : 164, Pl. 12 (1960).

Distr. Afghanistan.

Scutellaria Jodudiana B. Fedtsch., Conspect. Fl. Turkest. V: 158 (1913).-Juz. in Fl. URSS XX: 206, Tab. XII f. 1 (1954).-Murata in Kitamura, Fl. Pl. W. Pakistan (1964).

Mt. Noshaq, Qasideh Valley 3800-4000 m (Aug. 4, 1960 R. Yosii no. 629).

Distr. Pamir, Afghanistan and Pakistan.

Stachys parviflora Benth.-K. F. A. 348.

Between Mazarisharif and Haibak (Jul. 1, 1955 S. Kitamura), Kabul, Tomb of Baber (Jul. 14, 1955 S. Kitamura), between Kabul and Pagman (June 15, 1955 S. Kitamura), Shishigar (June 10, 1955 S. Kitamura), Lataband, Mullaomur (June 15, 1955 S. Kitamura).

Ziziphola pamiroalaica Juz. in Fl. URSS XXI: 399 et 668 (1954).-Murata in Kitamura, Fl. Pl. W. Pakistan 132 (1964).

Borak (Sept. 12, 1960 R. Yosii no. 1107), (Sept. 13, 1960 R. Yosii no. 1104), between Kotal-i-Bonarat and Doab (Sept. 6, 1960 R. Yosii no. 1043), Shewa Lake, Darwaz (Sept. 8, 1960 R. Yosii no. 1065), Mt. Noshaq, Qasideh Valley, 3040 m (Jul. 17-20, 1960 R. Yosii no. 490), (Jul. 16-17, 1960 R. Yosii no. 1171), 3200 m (Aug. 1, 1960 R. Yosii nos. 591, 592).

Distr. N. E. Afghanistan, W. Pakistan and Pamir.

Solanaceae

Hyoscyamus niger L.-K. F. A. 351.

Between Kabul and Pagman (June 17, 1960 R. Y. nos. 3, 1154), between Zebak and Borak, Badakhshan (Sept. 3, 1960 R. Y. no. 1204).

Hyoscyamus pusillus L.-K. F. A. 352.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 886).

Solanum nigrum L.-K. F. A. 353, errore nigrun.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 808, 862), (Aug. 29-31, R. Y. no. 942).

Scrophulariaceae by Takashi Yamazaki

Euphrasia kurramensis Pennell.-K. F. A. 355.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 416), Mt. Noshaq, Qasideh Valley 3040 m (July 17-20, 1960 R. Y. no. 432).

Euphrasia glanduloso-dentata H. Riedl in Ann. Naturh. Mus. Wien LXV: 34 (1962).

Distr. Afghanistan.

Euphrasia pagmanensis Rech. f.-K. F. A. 355.

Mt. Noshaq, Qasideh Valley 3040 m (July 29, 1960 R. Y. nos. 538, 539).

Leptorhabdos parviflora Benth.-K. F. A. 355.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 766, 767).

Linaria Lindbergiana H. Riedl in Ann. Naturh. Mus. Wien LXV : 35, Taf. 2-4 (1962).

Distr. Afghanistan (Shewa Lake).

Pedicularis Maximowiczii Korassnow in Script. Hort. Univ. Petrop. II : 18 (1889).-Maxim. in Mél. Biol. XII : 913 f. 164.-Vved. in Fl. URSS XXII : 728.

Mt. Noshaq, Qasideh Valley 3200 m (Aug. 1, 1960 R. Y. no. 594).

Distr. Tianshan and Afghanistan (Wakhan).

Scrophularia bamianica Gilli in Fedde, Rep. Sp. Nov. XLIII : 323, Abb. 2 (1960).

Distr. Afghanistan.

Scrophularia scoparia Pennell.-K. F. A. 359.

Mt. Noshaq, Qasideh Valley 3040 m (July 26, 1960 R. Y. nos. 529, 530, 531).

Veronica afghanica Gilli in Fedde, Rep. Sp. Nov. XLIII : 324 (1960).

Distr. Afghanistan.

Veronica beccabunga L.-K. F. A. 360.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 865, 866, 870), Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 586), Borak, Badakhshan (Aug. 12, 1960 R. Y. no. 371).

Veronica lanosa Royle ex Benth. in DC., Prodr. X : 481 (1846).-Pennell, l. c. 74.-Yamazaki in Kitamura, Fl. Pl. W. Pakistan 135 (1964).

Distr. Afghanistan, W. Pakistan and Himalayas.

Veronica Michauxii Lam., Tabl. Encycl. I : 44 (1791).-Boiss., Fl. Or. IV : 439 (1879).-Yamazaki, l. c. 135 (1944).

Distr. Iran, Afghanistan, W. Pakistan, and Pamir.

Bignoniaceae

Amphicome Emodi Lindley in Bot. Reg. XXIV t. 19 in nota (1838).-Boiss., Fl. Or. IV : 80 (1879).

Incarvillea Emodi (Lindl.) Chatterjee in Kew Bull. 1948 : 2.-Grierson in Notes Roy. Bot. Gard. Edinb. XXIII : 318 (1961).

Distr. Afghanistan, W. Pakistan and Himalayas (from Kashmir to Nepal).

Catalpa bignonioides Walt., Fl. Carol. 64 (1788).

Mazarisharif (July 1, 1955 S. Kitamura)-fr., cultivated as street tree.

Distr. A native of North America. Widely cultivated in Asia (W. Pakistan, China, Korea, and Japan).

Incarvillea Olgae Regel in Gartenflora XXIX : 3, t. 1001 (1880), XXX : 377 (1881).-Vassil. in Fl. URSS XXIII : 3, Tab. I (1958).-Grierson in Notes Roy. Bot. Gard. Edinb. XXIII : 321.

Between Zebak and Borak, Badakhshan (Sept. 3, 1960 R. Y. nos. 1222, 1194), Borak (July 12-13, 1960 R. Y. nos. 245, 200)-fl. and fr., Kabul, Dal-ur-aman-cultivated (July 18, 1955 S. Kitamura).

Distr. Pam.-Al. and Afghanistan (cultivated ?).

Dr. R. Yosii, in 1965, is not sure whether his specimens were wild or cultivated.

Orobanchaceae

Cistanche fissa (C. A. M.) G. Beck in Pflanzenfamilien IV : 3, b. : 129 (1895), Pflanzenreich Heft 96 : 39.-Novop. et Tzvel. in Fl. URSS XXIII : 26, Tab. III, fig. 3 (1958).-Gilli in Symb. Afgh. V : 254.

Distr. Caucasus, Amu-Dar., Gorn.-Turkm., Arm.-Kurd., Iran, and Afghanistan.

Cistanche tubulosa (Schenk) S. Wight, Icon. Pl. Ind. Or. IV : t. 1420 (1850).-Hooker f., Fl. Brit. Ind. IV : 324.-Novop. et Tzvel., l. c. 23, Tab. III, fig. 2 (1958). -Gilli, l. c. 254 (1963).

Distr. North Africa, Palestine, Syria, Iraq, Iran, Afghanistan, Central Asia, W. Pakistan, Dz.-Kashg., and Tibet.

Orobanche aegyptiaca Pers.-K. F. A. 362.

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. no. 1046), Furmular, Badakhshan (Sept. 5, 1960 R. Y. no. 1028).

Orobanche amoena C. A. Mey. in Ledebour, Fl. Alt. II : 457 (1830), Ic. Fl. Ross. IV : 23 t. 385 (1833).-G. Beck in Pflanzenreich, Heft 96 : 131, fig. 13, F-H (1930).-Novop. et Tzvl. in Fl. URSS XXIII : 74, Tab. V-fig. 2 (1958).-Gilli, l. c. 254. f. afghanica G. Beck, l. c. 133 (1930).

Distr. Southwest Europe, Western Siberia, Central Asia, Iran, Afghanistan, Dz.-Kashg., and Mongolia.

Orobanche anatolica Boiss. et Reut. in Pinard, Pl. Cariae exsicc. (1843), Fl. Or. IV : 504.-Beck in Pflanzenreich Heft 96 : 275.-Gilli in Symb. Afgh. V : 255 (1963).

Distr. Asia minor, Arm.-Kurd., Iran, and Afghanistan.

Orobanche angustelaciniata Gilli in Fedde, Rep. Sp. Nov. XLIII : 326, Abb. 3 (1960).

Distr. Afghanistan.

Orobanche caesia Reichenbach pat. Iconograph. VII : 48 fig. 936 (1829).-Beck in Pflanzenreich Heft 96 : 98 (1930).-Novop. et Tzvel. in Fl. URSS XXIII : 46.-Gilli, l. c. 255 (1963).

Distr. Europe, Caucasus, Siberia, Central Asia, Asia minor, Arm.-Kurd., Iran, Afghnistan and Dz.-Kashg.

Orobanche campestris Boiss. et Reut. in Boiss., Fl. Or. IV : 515 (1879).-Schiman-Czeika in Rech. f., Fl. Iran. Orobanchaceae 13 (1964).

Distr. Syria, Cilicia, Iraq, Iran, and Afghanistan.

Orobanche cernua Loefling.-K. F. A. 362.

Between Faizabad and Borak (July 7, 8, 1960 R. Y. no. 100), between Sarobi and Kabul (July 18, 1955 S. K.)-this was misplaced under O. alba Steph.-K. F.

A. 362.

Orobanche clavata Schiman-Czeika in Rech. f., Fl. Iran. Orobanchaceae 14, Tab. 5, 8-2 (1964).

Distr. Afghanistan.

Orobanche coelestis (Reut.) G. Beck, Monogr. Orob. 114, Tab. 2, fig. 21 (1890).-S.-Czeika, l. c. 9 (1964).

Distr. Mediterranean Region, Caucasus, Iran, Afghanistan, W. Pakistan, Pam.-Al., Dz.-Kashg.

Orobanche Hansii Kerner, Nov. plant. spec. decas II: 15 (1870).-S.-Czeika, l. c. 15.

Distr. Iran, Afghanistan, Himalayas and Tibet.

Orobanche Kotschyi Reut. in DC., Prodr. XI: 33 (1847).-S.-Czeika, l. c. 15 (1964).

Distr. Armenia, Kurdistan, Turkomania, Pam.-Al., Iran and Afghanistan.

Orobanche Muteli F. Schultz var. **spissa** (Rouy) G. Beck, Monogr. Orob. 96 (1890), in Pflanzenreich Heft 96: 79 (1930).-Gilli in Symb. Afgh. V: 256 (1963).

Distr. Europe, North Africa, Asia minor, Iraq, Caucasus, Arm.-Kurd., Iran, and Afghanistan.

Orobanche nana Noë in Reich., Herb. norm. no. 1352.-G. Beck in Pflanzenreich Heft 96: 70.-Novop. et Tzvel. in Fl. URSS XXIII: 69.-Gilli, l. c. 256 (f. macrostachys G. Beck.).

Distr. sp. Mediterranean Region, Caucasus, Iran, Pam.-Al., and Afghanistan.

Orobanche orientalis G. Beck, Monogr. Orob. 110 t. 1 fig. 19 (1890), in Pflanzenreich Heft 96: 90.-Novop. et Tzvel, l. c. 65 (1958).-Gilli, l. c. 256.

Distr. Caucasus, Iran, Afghanistan, Pam.-Al., W. Pakistan, and Kashmir.

Orobanche pogonanthera Reut. in DC., Prodr. XI: 33 (1847).-S.-Czeika, l. c. 12 (1964).

Distr. Iraq, Iran, Turkomania and Afghanistan.

Orobanche ramosa L., Sp. Pl. 633 (1753).-S.-Czeika, l. c. 6 (1964).

Distr. Europe, Mediterranean Region, Caucasus, Iraq, Iran and Afghanistan.

Orobanche Schultzii Mutel, Fl. Franc. II: 352 (1835).-S.-Czeika, l. c. 9 (1964).

Distr. Mediterranean Region and Afghanistan.

Orobanche Stocksii Boiss.-K. F. A. 362. *O. cistanchoides* G. Beck.

Distr. Iran and Afghanistan.

Orobanche vitellina Novop. in Not. Syst. Herb. Kom. XII: 288, fig. 8 (1949).-S.-Czeika, l. c. 15 (1964).

Distr. Caucasus, Arm.-Kurd. and Afghanistan.

Orobanche Wendelboi Schiman-Czeika, l. c. 12, Tab. 4, fig 1, Tab. 8, fig. 1.

Distr. Afghanistan.

Plantaginaceae

Plantago depressa Willd., Enum. Hort. Berol. Suppl. 8 (1813).-Pilger in Pflanzenreich, Heft 102: 272, Fig. 29 (1937).-Patzak in Symb. Afgh. V: 257 (1963). *P. tibetica* Hooker f. et Thom.

Mt. Noshaq, Qasideh Village (July 16, 17 1960 R. Y. nos. 737, 386), Qasideh Valley (Aug. 24, 1960 R. Y. no. 790).

Distr. Siberia to Saghalien, Korea, China, Dz.-Tarb., Tianshan, Tibet, Himalayas and Afghanistan.

Plantago Griffithii Decne. var. **alpina** Bornm. in Mitth. Thür. Bot. Ver. N. F. XI 67.

Plantago gentianoides S. et S. var. *alpina* Pilger in Fedde, Rep. XXI: 99 (1925), in Pflanzereich 102: 308.-Patzak, l. c. 258.

Distr. Afghanistan and Iran.

Plantago lanceolata L.-K. F. A. 364.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 7).

var. mediterranea (Kerner) Pilger.-K. F. A. 364.

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1145), (July 7, 1960 R. Y. no. 269).

Plantago major L.-K. F. A. 364.

Borak, Badakhshan (Sept. 12, 1960 R. Y. no. 1144), Ishkashim (Aug. 25, 26, 1960 R. Y. 804).

subsp. **pleiosperma** Pilger in Pflanzenreich Heft 102: 47 (1937).-Patzak, l. c. 259 (1963).

Distr. Cosmopolitan.

Plantago Psyllium L., Sp. Pl. ed. 2: 167 (1762).-Pilger in Pflanzenreich Heft 102: 422.-Grigor. in Fl. URSS XXIII: 162 (1958).-Patzak, l. c. 259 (1963).

Distr. Mediterranean Region, Gorn.-Turkm., Iran and Afghanistan.

Rubiaceae

Asperula humifusa (M. B.) Bess.-K. F. A. 366.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 1186).

Galium spurium L.-K. F. A. 368.

Pagman (June 17, 1960 R. Y. no. 1160).

Rubia tibetica Hooker f.-K. F. A. 370.

Mt. Noshaq, Qasideh Valley 3200 m alt. (Aug. 1, 1960 R. Y. no. 567).

Rubia Wallichiana Decne., Recherch. Anat. & Physiol. Garance (Mém. Acad. Brux. XII) 61 (1837).

Rubia cordifolia L. var. *Munjista* auct. non Miq.-K. F. A. 369.

Rubia cordifolia auct. non L.-Hooker f., F. B. I. III: 202 p. p.

Distr. Afghanistan, W. Pakistan and Himalayas.

Caprifoliaceae

Lonicera asperifolia (Decne.) Hooker f. et Thomson in Journ. Linn. Soc. Bot. II: 166 (1858).-Wendelbo in Rech. f., Fl. Iran. Caprifoliaceae 11 (1965).

Distr. Pam.-Al., Afghanistan, Pakistan, Himalayas, and Tibet.

Lonicera Korolkovi Stapf in Gard. and For. VII: 34, fig. 4 (1894).-Wendelbo, l. c. 13 (1965).

Distr. Pam.-Al., Tianshan, and Afghanistan.

Lonicera microphylla Willd.-K. F. A. 371.

Mt. Noshaq, Qasideh Valley, Wakhan 3040 m alt. (July 17-20, 1960 R. Y. nos. 480, 440)-fr.

Lonicera spinosa (Decne.) Walp., Repert. Bot. Syst. II: 449 (1843).-Wendelbo, l. c. 7 (1965).

Distr. Afghanistan and Himalayas.

Lonicera stenantha Pojark. in Bot. Zjurn. SSSR. XX: 151 (1935).-Wendelbo, l. c. 9 (1965).

Distr. Altai, Dz.-Tarb., Pam.-Al., Tianshan, Afghanistan, W. Pakistan, and Afghanistan.

Valerianaceae

Valeriana ficariaefolia Boiss., Fl. Or. III: 89 (1875).-Grubov in Fl. URSS XXIII: 618, Tab. XXXI, fig. 2 (1958).-Patzak in Symb. Afgh. V: 260 (1963).

Disir. Iran, Afghanistan, Gorn.-Turkm., Syr-Dar., Pam.-Al. and Dz.-Kashg.

Dipsacaceae

Morinia persica L.-K. F. A. 375.

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. no. 1070).

Campanulaceae

Asyneuma Thomsonii Bornm. var. **strictum** (Wendelbo) K. F. A. 377.

Asyneuma stricta Wendelbo in Nytt Mag. Bot. I: 60, Fig. 21 (1952).-Rech. f. et Riedl in Ann. Naturh. Mus. Wien LXV: 36 (1962).

Distr. var. Afghanistan (N. E.), W. Pakistan (Chitral).

Campanula leucantha Gilli in Fedde, Rep. Sp. Nov. LXVIII; 87 (1963).

Distr. Afghanistan.

Compositae

Achillea filipendulina Lam.-K. F. A. 383.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 265), Borak (Aug. 12, 1960 R. Y. no. 332).

Achillea Bieversteinii Afan. in Bot. Mater. Herb. Bot. Inst. SSSR XIX: 361 (1959), Fl. URSS XXVI: 97 (1961).

Achillea micrantha Willd. (1803 non Willd. 1789).-K. F. A. 383.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 12), between Zebak and Borak (Sept. 3, 1960 R. Y. nos. 1209, 1210).

Achillea Millefolium L.-K. F. A. 383.

Between Shewa Lake and Doab, Darwaz (Sept. 8, 1960 R. Y. nos. 1082, 1081), Shewa, Darwaz (Sept. 8, 1960 R. Y. no. 1073).

Acroptilon repens (L.) DC.-K. F. A. 385.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 48)-ante anthesin, Qasideh Village (Aug. 24, 1960 R. Y. no. 747), Ishkashim (Aug. 29-31, 1960 R. Y. nos. 933, 936), between Faizabad and Borak (July 7-8, 1960 R. Y. no. 1184), Borak (July 12-13, 1960 R. Y. no. 262).

Iljin reported Acroptilon australe Iljin with large involucres (13-18 mm long 7-13 cm broad) from Afghanistan in Bot. Mater. VII: 60 (1937). All our specimens have small heads.

Amberboa bucharica Iljin in Bull. Jard. Bot. Acad. Sc. URSS XXX : 108 (1931).-N. N. Tzelev in Fl. URSS XXVIII: 332, Tab. XVIII, fig. 2, Tab. XX, fig. 3.

Amberboa moschata auct.-K. F. A. 384.

Distr. Tianshan, Syr-Dar., Pam.-Al., Gorn-Turkm., Iran, and Afghanistan.

Anaphalis contorta Hooker f. var. roseo-alba (Krasch.) K. F. A. 384.

Mt. Noshaq, Qasideh Valley 3040 m (June 17-20, 1960 R. Y. no. 438)-ante anthesin, Mt. Noshaq, Qasideh Valley 3200 m (Aug. 1, 1960 R. Y. no. 551)-ante anthesin.

Anthemis tenuifolia Gilli in Fedde, Rep. Sp. Nov. LXVIII: 92 (1963).

Distr. Afghanistan.

Artemisia Sect. **Dracunculus.**

Artemisia annua L.-K. F. A. 386.

Borak (Sept. 12, 1960 R. Y. no. 1150).

Artemisia Dracunculus L.-K. F. A. 386.

Between Shewa Lake and Doab, Darwaz (Sept. 9, 1960 R. Y. no. 1079), Borak (Sept. 12, 1960 R. Y. no. 1108), between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. no. 1044).

Artemisia scoparia Wald. et Kit.-K. F. A. 386.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 915, 916, 917, 945, 946, 947, 948, 949, 950, 951, 955), Borak (Aug. 12, 1960 R. Y. nos. 367, 369)-ante anthesin, Borak (Sept. 12, 1960 R. Y. no. 1124), Qasideh Village (Aug. 24, 1960 R. Y. nos. 744, 749).

Artemisia Sect. **Abrotanum.**

Artemisia Gmelinii Web. ex Stechm., Dissert. de Artem. 17 (1775).-DC., Prodr. VI: 160.-Kitamura, Fl. Pl. W. Pakistan 142 (1964).

A. sacrorum Ledeb.-K. F. A. 388.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 781), between Zebak and Borak (Sept. 3, 1960 R. Y. nos. 1198, 1200).

Artemisia Roxburghiana Besser.-K. F. A. 388, Fl. Pl. W. Pakistan 142 (1964).

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 899, 900), (Aug. 25-26, 1960 R. Y.

nos. 816, 829), Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 417).

Artemisia rutifolia Steph. var. dasyantha (Schrenk) Kitamura, Fl. Pl. W. Pakistan 142 (1964).

A. Turczaninoviana Reichenb. var. *dasyantha* Schrenk.-K. F. A. 389.

Mt. Noshaq 3040 m (July 17-20, 1960 R. Y. nos. 483, 453), between Zebak and Borak (Sept. 3, 1960 R. Y. nos. 1196, 1197), Qasideh Village (Aug. 24, 1960 R. Y. nos. 752, 751), Mt. Noshaq, Qasideh Valley (July 16-17, 1960 R. Y. no. 1170).

Artemisia Tournefortiana Reich.-K. F. A. 389.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 822, 824)-ante anthesin, between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1220).

Artemisia Sect. **Absinthium.**

Artemisia macrocephala Jaquemont ex DC.-K. F. A. 389.

Qasideh Village (Aug. 24, 1960 R. Y. nos. 745, 782).

Artemisia persica Boiss.-K. F. A. 389.

Between Kotal-i-Bonarat and Doab (Sept. 6, 1960 R. Y. no. 1051), between Kabul and Pagman (June 17, 1960 R. Y. nos. 63, 64, 62), Mt. Noshaq, Qasideh Valley 3040 m (July 17-20, 1960 R. Y. no. 455)-ante anthesin.

Artemisia Sieversiana Willd., Sp. Pl. III, 3: 1845 (1804).-Kitamura, Fl. Pl. W. Pakistan 143.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 847, 852, 849), Ishkashim (July 16, 1960 R. Y. no. 373)-ante anthesin, Borak (Aug. 12, 1960 R. Y. no. 368)-ante anthesin, Ishkashim (Aug. 29-31, 1960 R. Y. nos. 954, 1179).

Dsitr. From Southern Russia eastwards to Korea and Nepal.

Artemisia Sect. **Seriphidium.**

Artemisia bicolor Rech. f. et Wagenitz in Anzeiger Math.-Naturv. Kl. Österr. Akad. Wiss. 1961 nr. 7: 2 (1961).

Distr. Afghanistan.

Artemisia flavifolia Gilli in Fedde, Rep. Sp. Nov. LXVIII: 94 (1963).

Distr. Afghanistan.

Artemisia Lehmaniana var. Skorniakovii Winkl. ex Poljack., Fl. URSS XXVI: 623.

Artemisia Skorniakovii C. Winkler.-K. F. A. 389.

Artemisia maritima L. sensu ampl.

Between Zebak and Borak (Sept. 3, 1960 R. Y. nos. 1195, 1215, 1202, 1201, 1193), Ishkashim (Aug. 29-31, 1960 R. Y. nos. 924, 927, 928 952, 953), Borak (Aug. 12, 1960 R. Y. no. 361)-ante anthesin, Furmular, Badakhshan (Sept. 5, 1960 R. Y. no. 1038)-ante anthesin, Mt. Noshaq, Qasideh Valley 3040 m (July 26, 1960 R. Y. nos. 513, 514)-ante anthesin, Mt. Noshaq, Qasideh Valley 4000 m (Aug. 21, 1960 R. Y. no. 736)-heads aggromerate, flowers 8-9 in a head.

Aster altaicus Willd.-K. F. A. 391.

Between Zebak and Borak (Sept. 3, 1960 R. Y. nos. 1223, 1224).

Bidens tripartita L.-K. F. A. 392.

Borak, Badakhshan (Sept. 4, 1960 R. Y. nos. 1007)-achenia minora corpore 5-6 mm longa.

Blumea mollis (D. Don) Merr. in Philip. Journ. Sci. Bot. V: 395 (1910).-Randeria in Blumea X: 261 (1960). *Erigeron molle* D. Don (1825). *Blumea Wightiana* DC.-K. F. A. 392.

Breea arvensis Less. var. alpestris (Naeg.) Kitamura, F. A. 393.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 913, 911).

Carduus onopordioides Fisch.-K. F. A. 394.

Carduus songaricus (Winkl.) Tamamsch. in Notulae Syst. ex Herb. Kom. XV: 391 fig. β. (1953), Fl. URSS XXVIII: 11.

Carduus Schischkinii Tamamsh., l. c. 389 fig. δ (1953), Fl. URSS XXVIII: 12.

As mentioned already in K. F. A. 394, this species is very variable. The forms described by Tamamschian as *C. songaricus* and *C. Schischkinii*, are also found in Nuristan.

Carthamus lanatus L.-K. F. A. 394.

Borak (July 12-13, 1960 R. Y. no. 214).

Centaurea depressa Bieb.-K. F. A. 395.

Pagman (June 17, 1960 R. Y. no. 6).

Centaurea iberica Trev.-K. F. A. 397.

Between Faizabad and Borak (July 7-8, 1960 R. Y. no. 94), between Zabak and Borak (Sept. 3, 1960 R. Y. nos. 1203, 1191).

Chondrilla lejosperma Kar. et Kir. in Bull. Soc. Nat. Mosc. XIV, 3: 456 (1841), l. c. XV, 2: 397 (1942).-Leonova in Fl. URSS XXIX: 574, Tab. XXVIII, fig. 2 (1964).

Borak, Badakhshan (Sept. 4, 1960 R. Y. no. 998), (Sept. 12, 1960 R. Y. no. 1147).

Distr. Central Asia widely distributed, Afghanistan, Dz.-Kashg. and Mongolia.

Some specimens referred as C. juncea from Afghanistan may belong here.

The beak of the achene, easily separate at its base from the body by an articulation.

The inner involucral scales of this species have bristles at the apex. While the inner involucral scales of C. juncea have no bristle.

Chondrilla phaeocephala Rupr. in Mém. Acad. Pétersb. XIV, 4: 59 (1869).-Leonova in Fl. URSS XXIX: 577, Tab. XXVIII, fig. 3 (1964).

Chondrilla graminea err. det. Kitamura, Fl. Pl. W. Pakistan 145 (1964).

Between Zebak and Borak, Badakhshan (Sept. 3, 1960 R. Y. nos. 1199, 1219), Qasideh Village (Aug. 24, 1960 R. Y. no. 746).

Distr. Tianshan, Pam.-Al., Dz.-Kashg., Afghanistan and W. Pakistan.

Chondrilla Yosiii Kitamura sp. nov. **Fig. 4.**

Species C. laticorna affinis a qua foliis longioribus, involucri squamis apice

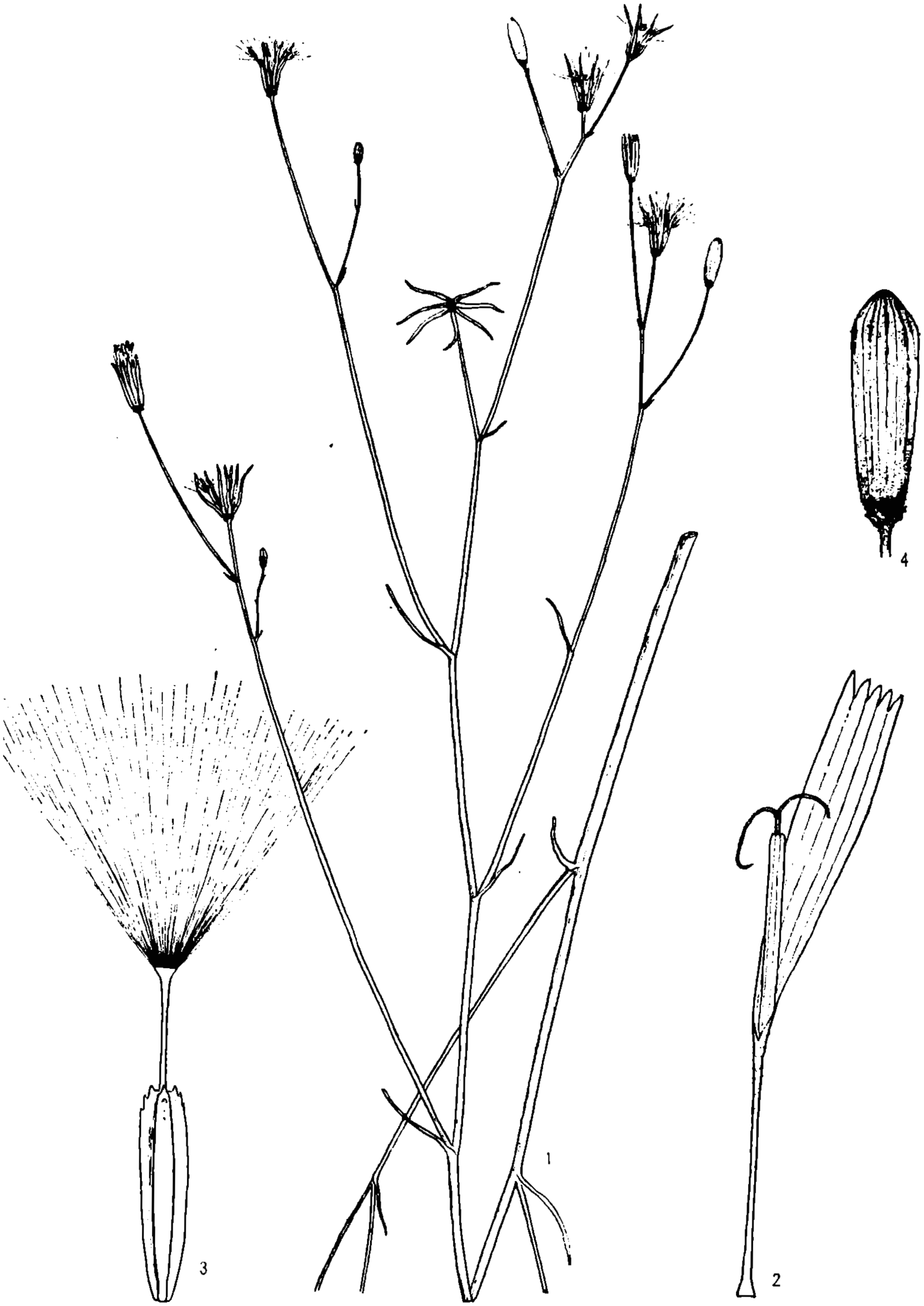

Fig. 4 Chondrilla Yosiii Kitamura 1 Plant 2 Ligule 3 Achene 4 Involucre (Badakhshan : Zebak).

tantum parce setosis, rostro achenii longiore, squamarum corollulae forma differt.

Caulis circ 70 cm altus ascendens, teres glaber 3–3.5 mm in diametro, ramis gracilibus ascendentibus. Folia radicalia et inferiora sub anthesi emarcida, caulina media linearia 3.5–4 cm lata apice obtusa vel acuta, uninervia glabra, folia superiora sursum gradatim minora linearia, demum bracteiformia. Capitula ad apices ramulorum terminantia erecta, longe stricteque pedunculata. Involucrum cylindricum sub anthesi 11 mm longum, araneo-floccosum, squamae, exteriores late ovatae vel ovatae 0.8–1.2 mm longae, interiores 8, lineares hyalino-marginatae uninerviatae apice obtusae nigrescentes muticae vel setis unis praeditae. Flores 9, corolla flava, 17.5 mm longa, ligula 11 mm longa, tubo 6.5 mm longo, anthera 5 mm longa. Achenia 6 mm longa, rostro basi articulato apice sub pappo cupuliformi gracile 3 mm longo, corpore anguste-oblongo 3 mm longo 0.7 mm lato, longitudinaliter striato, apice squamis parvis integris irregulariter transverse biseriatis praedito. Pappus candidus 7.5 mm longus, setis copiosis gracilibus integris apice attenuatis.

Typus Afghanistan: Zebak, Babakhshan (Aug. 15, 1960 R. Y. no. 351)-in Herb. Univ. Kyoto.

This species differs from C. lejosperma by the smooth stem, narrower leaves, and smaller achenes with smaller entire tubercles.

Some specimens referred by Hooker f. in Flora of British India III: p. 402, as Chondrilla graminea may belong here.

Chrysanthemum Griffithii Clarke.-K. F. A. 400.

Spathipappus Griffithii (Clarke) Tzvel. in Fl. URSS XXVI: 262, Tab. X, fig. 1 (1961).

Mt. Noshaq, Qasideh Valley, 3040 m (July 17–20, 1960 R. Y. nos. 444, 446).

Distr. Pam.-Al., Afghanistan and W. Pakistan.

Chrysanthemum myriocephalum Rech. f. in Anz. Math.-Naturw. Kl. Österr. Akad. Wiss. 1961 Nr. 5: 2 (1961).

Distr. Afghanistan. Related to Chr. umbelliferum.

Chrysanthemum pyrethroides (Kar. et Kir.) B. Fedtsch., Rast. Turk.: 737 (1915). -Kitamura, Fl. Pl. W. Pakistan: 145 (1964).

Richteria pyrethroides Kar. et Kir. in Bull. Soc. Nat. Mosc. XV: 127 (1842).

Chrysanthemum Richteria Benth.-K. F. A. 402.

Chrysanthemum turkestanicum (Regel et Schmalh.) Gilli in Fedde, Rep. Sp. Nov. LXVIII: 94 (1963).

Crossostephium turkestanicum Regel et Schmalh. in Pl. Nov. Fedsch. 44 (1882).

Chrysanthemum chrysostachys (Rech. f. et Köie) Kitam., F. A. 398.

Lepidolopsis turkestanica (Regel et Schmalh.) Poljak. in Not. Syst. Herb. Kom. XIX: 375 (1959), Fl. URSS XXVI: 316, Tab. XII, fig. 2 (1961).

Artemisia chrysostachys Rech. et Köie, Symb. Afgh. 52 (1955).

Distr. Tianshan, Syr-Dar., Pam.-Al., and Afghanistan.

Cichorium Intybus L.-K. F. A. 407.

Borak (July 12-13, 1960 R. Y. no. 218).

Cirsium Acarna (L.) Moench.-K. F. A. 407.

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. no. 1040).

Cirsium stenobracteatum Gilli in Fedde, Rep. Sp. Nov. LXVIII : 97 (1963).

Distr. Afghanistan.

Cirsium turkestanicum (Regel) Petrak in Öest. Bot. Zeitschr. LX, 9 : 351 (1910).-Charadze in Fl. URSS XXVIII : 124.

Cirsium afghanicum Gilli in Fedde, Rep. Sp. Nov. LXVIII : 96 (1963).

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. no. 1056).

Distr. Tianshan, Pam.-Al. and Afghanistan.

A very beautiful and vigorous plant first published as C. eriophorum γ. turkestanicum Regel in 1880.

Cirsium Wallichii DC. var. glabratum (Hooker f.) Wendelbo.-K. F. A. 408.

Between Kotal-i-Bonarat and Doab, Badakhshan (Sept. 6, 1960 R. Y. nos. 1054, 1059).

Cousinia Baberi Boiss.-K. F. A. 410.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 11).

Cousinia fascicularis Juz., l. c. 299 (1937).-Tschern. in Fl. URSS XXVII : 184.

Cousinia Gilli Rech. f.-K. F. A. 412.

Distr. Pam.-Al., Afghanistan.

Cousinia Gontscharowii Juz. in Acta Inst. Bot. Acad. Sc. URSS, ser. 1, fasc. 3 : 311 (1937).-Tschern. in Fl. URSS XXVII : 170.

Cousinia catenata Rech. f.-K. F. A. 411.

Distr. Pam.-Al. and Afghanistan.

Cousinia leptacancha Rech. f. (1955) non Juzep. (1940) should be reexamined.

Cousinia pseudarctium Bornm. in Beih. Bot. Centr. XXXIV, 2 : 136 (1916).-Tschern. in Fl. URSS XXVII : 179 (1962).

Cousinia spuria Juzepzuk.-K. F. A. 417.

Distr. Pam.-Al. and Afghanistan.

Cousinia pulchra Winkler in Acta Horti Petrop. X : 478 (1887).-Tscherneva in Fl. URSS XXVII : 280 (1962).

Cousinia pseudo-stenolepis Rech. f. et Edelb.-K. F. F. 415.

Distr. Pam.-Al. Afghanistan.

Cousinia ramulosa Rech. f.-K. F. A. 416.-Tschern. in Fl. URSS XXVII : 348.

Cousinia Lindbergii Rech. f. in Ann. Naturh. Nus. Wien LXV : 36, Taf. 2-5 (1962).

Shewa Lake, Darwaz (Sept. 8, 1960 R. Y. nos. 1066, 1071).

Distr. Pam.-Al. and Afghanistan.

Cousinia schistoptera Juzepzuk in Acta Inst. Bot. Acad. Sc. URSS, ser. 1, fasc. 3 : 301 (1937).-Tscherneva in Fl. URSS XXVII : 165.

Cousinia schizoptera Juzep. ex Rechinger f.-K. F. A. 416.

Distr. Kyz.-Kum., Kara-Kum., Gorn.-Turkm. and Afghanistan.

Cousinia semidecurrens Winkler in Acta Horti Petrop. X: 574 (1889).-Tscherneva, l. c. 222 (1962).

Cousinia chionophila Rech. f. et Köie.-K. F. A. 411.

Mt. Noshaq, Qasideh Valley, Wakhan 3200 m alt. (Aug. 1, 1960 R. Y. no. 615).

Distr. Pam.-Al. and Afghanistan.

Cousinia semilacra Juzep., l. c. 322 (1937).-Tschern., l. c. 342 (1962).

Cousinia Jacea Rech. f. et Edelberg.-K. F. A. 413.

Distr. Pam.-Al. and Afghanistan.

Cousinia stenocalathia Rech. f.-K. F. A. 417.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 1199), Borak, Badakhshan (Sept. 13, 1960 R. Y. no. 1199).

Crepis flexuosa (DC.) Benth. et Hooker f.-K. F. A. 419.

Mt. Noshaq, Qasideh Valley, 3200 m (Aug. 1, 1960 R. Y. no. 583), (June 16-17, 1960 R. Y. no. 504), 3040 m (June 17-20, 1960 R. Y. no. 498).

Crepis oreades Scherenk.-K. F. A. 419.

Mt. Noshaq, Qasideh Valley, 3200 m (Aug. 1, 1960 R. Y. nos. 587, 593), 3800-4000 m (Aug. 4, 1960 R. Y. no. 649).

Caudex 1-3.5 cm longus. Achenia 5 mm longa. Pappus 5.5 mm longus.

Crepis pulchra L. subsp. turkestanica Babcock.-K. F. A. 419.

Borak, Badakhshan (July 12-13, 1960 R. Y. no. 252).

Echinops afghanicus Gilli in Fedde, Rep. Sp. Nov. LXVIII: 95 (1963).

Distr. Afghanistan.

Echinops cornigerus DC., Prodr. VI: 525 (1838).-Hooker f., Fl. Brit. Ind. III: 358.-Kitamura, Fl. Pl. W. Pakistan 147 (1964).

Echinops polygraphus Tscherneva in Bot. Mat. Herb. Inst. Bot. An Uzbss R. XVI: 52 (1961).

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 409)-fl. buds. Involucral scales 13-15 in all, inner 5 scales pubescent by lens.

Distr. Pam.-Pl., Afghanistan, W. Pakistan, and Himalayas.

Erigeron acris L.-K. F. A. 420.

Ishkashim (Aug. 1960 R. Y. nos. 840, 838), (Aug. 29-31, 1960 R. Y. no. 777), Borak (Aug. 12, 1960 R. Y. no. 286), between Zebak and Borak (Sept. 3, 1960 R. Y. no. 1227).

Erigeron andryaloides (DC.) Benth.-K. F. A. 421.

Erigeron stenodon Rech. f. et Edelb., Symb. Afgh. II: 23, figs. 14, 15e (1955).-K. F. A. 422.

Mt. Noshaq, Qasideh Valley, 3200 m (Aug. 1, 1960 R. Y. 571).

E. andryaloides var. **glabrescens** Kitamura var. nov.

Folia radicalia spathulato-oblanceolata, longe petiolata, inciso-dentata, 3-6 cm longa 6-10 mm lata, utrinque viridia glanduloso-pubescentia. Caulis monocephalus, foliis linearibus parvis 1-2 praeditus, glanduloso-pubescens. Capitula circ. 1.5 cm diametro. Flores disci foeminei, ligula flava oblonga 0.7 mm lata. Involucrum in sicco 6 mm longum. Achenia 3 mm longa dense hirsuta. Pappus 3.5 mm longus.

Mt. Noshaq, Qasideh Valley, 3800-4000 m (Aug. 4, 1960 R. Y. no. 643)-Typus in Herb. Univ. Kyoto.

Erigeron brachyspermum Botsch. in Bot. Mat. Herb. Bot. Inst. SSSR XVIII: 266 (1957), Fl. URSS XXV: 269 (1959).

Mt. Noshaq, Qasideh Valley 3800-4000 m (Aug. 4, 1960 R. Y. nos. 656, 657).

Distr. Pam.-Al. and Afghanistan (Wakhan).

Erigeron canadensis L.-K. F. A. 421.

Borak (Aug. 12, 1960 R. Y. no. 568)-ante anthesin, (Sept. 4, 1960 R. Y. no. 979).

Erigeron himalayensis Vierh.-K. F. A. 421.

Mt. Noshaq, Qasideh Valley 4000 m (Aug. 21, 1960 R. Y. no. 731), (July 17-20, 1960 R. Y. nos. 439, 445, 486, 487, 451).

Erigeron lachnocephalus Botsh. in Fl. URSS XXV: 230 (1959).

Distr. Dz.-Tarb., Pam.-Al., Tianshan, Afghanistan (Wakhan), and Dz.-Kashg.

Erigeron petroiketes Rech. f.-K. F. A. 422.

Mt. Noshaq, Qasideh Valley, 4000 m. (Aug. 21, 1960 R. Y. nos. 702, 693, 700).

Very closely related to Erigeron uniflorus L. differing only by narrower leaves. This may be a variety of E. uniflorus.

Erigeron lumbricoides Gilli in Fddde, Rep. Sp. Nov. LXVIII: 89 (1963).

Distr. Afghanistan.

Erigeron sphaeroxylus Gilli, l. c. 88 (1963).

Distr. Afghanistan.

Filago arvensis L.-K. F. A. 423.

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 757, 761).

Hertia intermedia (Boiss.) O. Kuntze.-K. F. A. 424.

Between Kabul and Pagman (June 17, 1960 R. Y. no. 13).

Inula gracilis Gilli in Fedde, Rep. Sp. Nov. LXVIII: 90 (1963).

Distr. Afghanistan.

Inula pygmaea Gilli, l. c. 91 (1963).

Distr. Afghanistan.

Inula rhizocephala Schrenk.-K. F. A. 427.

Mt. Noshaq, Qasideh Village (July 16-17, 1960 R. Y. no. 412), Mt. Noshaq, 3040 m (July 29, 1960 R. Y. no. 542).

Koelpinia macrantha Winkler in Acta Horti Peterop. XI, 5: 285 (1890).-Vassil. in Fl. URSS XXIX: 23 (1964).

Distr. Afghanistan, Iran, Gorn.-Turkm., Kara-Kum., Am.-Dar. and Pam.-Al.

Lachnophyllum gossypinum Bunge.-K. F. A. 428.

Furmular, Badakhshan (Sept. 5, 1960 R. Y. no. 1029)-ante anthesin.

Lactuca altaica Fischer et Mey. in Index Sem. Horti Petrop. XI: 73 (1846).-Kirp. in Fl. URSS XXIX: 303, Tab. XVIII, fig. 1 (1964).

Lactuca saligna auct. non L.-K. F. A. 430.

Distr. Eastern Europe, Caucasus, W. Siberia, Central Asia, Eastern Mediterranean Reg., Arm.-Kurd., Iran, and Afghanistan.

Lactuca dolichophylla Kitamura nom. nov.

Lactuca longifolia DC., Prodr. VII: 135 (1838) non Michaux (1803).-K. F. A. 428.

Mulgedium sagittatum Royle, Ill. 252, t. 61, f. 2 (1835) not *Lactuca sagittata* Wald. et Kit. (1802).

Lactuca Lipskyi Krasch. in Flora et Syst. III: 353 (1936) pro syn.

Zollikoferia polyclada Boiss., Fl. Orient. III: 827 (1875).

Cicerbita Lipskyi Krash., l. c. 353 (1936).

Lactuca intricatissima Rech. f. (1955).-K. F. A. 428.

Cephalorrhynchus polyclados (Boiss.) Kirp. in Fl. URSS XXIX: 350 (1964).

Distr. Gorn.-Turkm., Pam.-Al., Iran, and Afghanistan.

As there is already earlier homonym Lactuca polyclada Boiss., the second legitimate name C. Lipskyi is used.

Lactuca orientalis Boiss.-K. F. A. 430.

Scariola orientalis Sojak. in Nov. Bot. Horti Bot. Univ. Car. Prag. 46 (1962).

Ishkashim (Aug. 29-31, 1960 R. Y. nos. 931, 932), Borak (Aug. 12, 1960 R. Y. no. 365)-ante anthesin.

Lactuca tatarica (L.) C. A. Mey.-K. F. A. 431.

Ishkashim (Aug. 25-26, 1960 R. Y. nos. 634, 835), Mt. Noshaq (July 16-17, 1960 R. Y. no. 415).

Leontopodium nanum (Hooker f. et Thomson) Hand.-Mzt. in Beih. Bot. Centralbl. XLIV: 111 (1928).-Grubov in Fl. URSS XXV: 359.-Kitam., Fl. Pl. W. Pakistan 151 (1964).

Mt. Noshaq, Qasideh Valley 4000-4500 m (Aug. 10-15, 1960 R. Y. no. 667), 4000 m (Aug. 21, 1960 R. Y. nos. 688, 690).

Distr. Afghanistan (Wakhan), W. Pakistan, Pam.-Al., Himalayas, Tibet and China (Kansu).

Matricaria disciformis DC.-K. F. A. 433.

Borak (Sept. 12, 1960 R. Y. no. 1110), Ishkashim (July 16, 1960 R. Y. no. 343), between Kabul and Pagman (June 17, 1960 R. Y. no. 68).

Myriactis nepalensis Less. in Linnaea VI: 128, t. 2 (1831).

Myriactis Wallichii Less.-K. F. A. 433.

Borak (Sept. 4, 1960 R. Y. nos. 1018, 1015).

M. nepalensis and M. Wallichii belong to one species.

Onopordon leptolepis DC.-K. F. A. 434.

Between Ghazni and Kabul (June 7, 1955 H. Kihara), Charikar (June 23, 1955 S. K.).

The specimens cited above were erroneously inserted under O. Acanthium.

Paramicrorhynchus procumbens (Roxb.) Kirp. in Fl. URSS XXIX : 237 (1964).

Prenanthes procumbens Roxb., Fl. Indica III : 404 (1832).

Microrhynchus fallax Jaub. et Spach, Ill. Pl. Or. III : 106 (1847-1850).

Launaea fallax Kuntze.-K. F. A. 431.

Pulicaria gnaphaloides Boiss.-K. F. A. 438.

Furmular, Badakhshan (Sept. 5, 1960 R. Y. nos. 1030, 1032).

Reichardia tingitana Roth, Bot. Abh. 35 (1787).

Picridium tingitanum Desf., Fl. Atlant. II : 200 (1800).-K. F. A. 435.

Rhaponticum nanum Lipsky in Acta Horti Petrop. XVIII, 1 : 80 (1900).-Soskov in Fl. URSS XXIX : 322.

Rh. pellucidum Rech. f., Symb. Afgh. II : 184 (1955).-K. F. A. 438.

Distr. Pam.-Al., Tianshan and Afghanistan.

Saussurea viridifolia Gilli in Fedde, Rep. Sp. Nov. LXVIII : 98 (1963).

Distr. Afghanistan.

Schischkinia albispina (Bunge) Iljin in Fedde, Rep. XXXVIII : 73 (1935), Fl. URSS XXVIII : 352 (1964).

Microlonchus albispina Bunge.

Oligochaeta albispina (Bunge) Rech. f.-K. F. A. 434.

Iljin considered Oligochaeta leucosmerinx Rech. as a syn. of S. albispina.

Scorzonera Linderbergii Rech. f. in Ann. Naturhist. Mus. Wien Vol. LXV : 37, Tab. 2-6 (1962).

Distr. Afghanistan (Shewa Lake).

Scorzonera Litvinovii Krass. et Lipsch. in Bull Soc. Nat. Mosc. 1934 n. s. XLIII : 153.-Lipsch. in Fl. URSS XXIX : 110.

Scorzonera Codringtonii Rech. f. in Oesterr. Bot. Zeitschr. XCVII : 263 (1950).-K. F. A. 441.

Distr. Gorn.-Turkm., Pam.-Al., Iran, and Afghanistan.

Scorzonera monocarpica Kitamura in Acta Phytotax. Geobot., XVIII : 37 (1957), F. A. 441, Fig. 102.

Epilasia prostrata Gilli in Fedde, Rep. Sp. Nov. XLXIII : 99 (1963).

The type locality is between Pulikhumri (Prov. Katagan) and Haibak (Prov. Mazari-sharif), not Nuristan.

Scorzonera tragopogonoides Regel et Schmalh. in Acta Horti Petrop. V : 635 (1877).

Scorzonera crassicaulis Rech. f., Symb. Afgh. II : 191 (1955).

Distr. Syr-Dar., Tianshan, Pam.-Al. and Afghanistan.

Scorzonera nuristanica K. F. A. 443.

S. nuristanica differs from S. turkestanica by longer leaves (12-33 cm long 2.5-5 mm broad, not 10-13 cm long 3 mm broad), and by larger achenes (19-20 mm long, not 12-15 mm long), and by the head with 6-7 florets.

Senecio hindukushensis Kitamura, F. A. 446.

Qasideh Village (Aug. 24, 1960 R. Y. nos. 738, 739).

Distr. Afghanistan and W. Pakistan.

Senecio sisymbriformis DC., Prodr. VI: 366 (1938).

Senecio Koelzii Rech. f., Symb. Afgh. II: 57 (1955).-K. F. A. 446.

Mt. Noshaq, Qasideh Valley, 3200 m (Aug. 1, 1960 R. Y. no. 584), 3800-4000 m (Aug. 4, 1960 R. Y. no. 557).

Distr. Afghanistan, W. Pakistan and Kashmir.

Serratula latifolia Boiss.-K. F. A. 447.

Schumeria latifolia Iljin in Not. Syst. Kom. XX: 364, fig. 3 (1960).

Distr. Gorn.-Turkm., Iran and Afghanistan.

Siegesbeckia orientalis L.-K. F. A. 447.

Borak, Badakhshan (Sept. 12, 1960 R. Y. nos. 1151, 1152).

The Afghan specimens are just like the figure given in Fl. URSS XXV, Tab. XXXIV, fig. 2.

The type locality of S. orientalis is in China.

The leaves of Eastern Asiatic specimens are inciso-dentate at the margin, and the lower lobes are large, while the leaves of Afghan specimens are irregularly dentate and the lower teeth are small, and look like those of S. orientalis subsp. glabrescens (Makino) Kitamura. But the stem of S. orientalis var. glabrescens elongates, and has shorter hairs.

The involucral scales are variable in their shape.

The writer proposes the rank of subspecies for the race of these Central Asiatic plants, Siegesbeckia orientalis subsp. caspica (Fisch. et Mey.) Kitamura. *S. caspica* Fischer et Mey. ex Hohen, Enum. Pl. Talysch. 54 (1838).

Siegesbeckia iberica Willd. is identical with S. orientalis.

Sonchus oleraceus L.-K. F. A. 448.

Ishkashim (Aug. 29-31, 1960 R. Y. no. 703).

Taraxacum subecorniculatum Gilli in Fedde, Rep. Sp. Nov. LXVIII: 100 (1963).

Distr. Afghanistan.

Tragopogon gracile Don.-K. F. A. 452.-Boris. in Fl. URSS XXIX: 150 (1964).

Distr. Afghanistan, W. Pakistan, Pam.-Al., and Himalaya.

Tragopogon Krascheninnikovii S. Nikit. in Flora et Syst. I: 191 (1933).-Borissova in Fl. URSS XXIX: 140 (1964).

Tragopogon longirostre auct. fl. asiae mediae non Bisch ex Sch. Bip.-K. F. A. 452.

Tragopogon afghanicum Rech. f. et Köie, Symb. Afgh. II: 189, figs. 128, 129.-

K. F. A. 450.

Between Faizabad and Borak, Badakhshan (July 7-8, 1960 R. Y. no. 200)-fr.

Volutarella ramosa (Roxb.) Kitamura, Fl. Pl. W. Pakistan 159 (1964), errore *Voluturella*.

Distr. India, W. Pakistan and Afghanistan.

Waldheimia Stoliczkae (C. B. Clarke) Ostenf. in Hedin, S. Tibet VI, 3: 38 (1922).-Kitamura, Fl. Pl. W. Pakistan: 160 (1964).

Mt. Noshaq, 3800-4000 m (Aug. 4, 1960 R. Y. no. 729).

Distr. Tianshan, Pam.-Al., Wakhan, W. Pakistan, and Kashmir.

Waldheimia tomentosa (Decne.) Regel in Acta Horti Petrop. VI: 308.-Kitamura, l. c. 160 (1964).

Mt. Noshaq, Qasideh Valley, 4000-4500 m (Aug. 10-15, 1960 R. Y. no. 673), 3800-4000 m (Aug. 10-15, 1960 R. Y. no. 673), 3800-4000 m (Aug. 4. 1960 R. Y. no. 654).

Distr. Tianshan, Pam-Al., Wakhan, W. Pakistan, and Himalayas (from Kashmir to Kumaon).

Xeranthemum longepapposum Fischer et Mey.-K. F. A. 453.-Lincz. in Fl. URSS XXVII: 65.

Distr. Caucasus, Dz.-Tarb., Gorn.-Turkm., Pam.-Al., Tianshan, Iran, Afghanistan and Asia minor.

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Comparison between the Afghan flora and the Japanese flora

Number of species compared

	Afghanistan	Japan		Afghanistan	Japan
Gymnospermae	16	39	Compositae	459	360
Monocotyledoneae	514	1140	Leguminosae	357	97
Choripetalae	1471	1839	Cruciferae	202	65
Sympetalae	1186	629	Labiatae	167	86
Total	3187	3647	Gramineae	250	231

Zoology

The Blattaria from Iran and Afghanistan

By

Syoziro ASAHINA*

The following three species of cockroaches were taken by the members of Japanese expeditions to Iran, 1956, and Afghanistan, 1955 and 1960. These three species were also recorded by Princis (1961) based upon the collection of German Afghanistan Expedition in 1956.

1. **Polyphaga saussurei** (Dohrn, 1888) Pl. I, fig. 1 ; Text-fig. 1, 2.

1 ♂ Nain, Iran, 12. VIII. 1956, leg. S. Azuma "On the floor of a house."

A Central Asiatic species found in Kazakstan, Tashkent, Uzbekstan, Karakorum, Azerbaijan, Afghanistan and Iran.

2. **Blatta (Shelfordella) lateralis** (Walker, 1868) Pl. I, fig. 2, 3 ; Text-fig. 3, 4.

Syn.: *Periplaneta tartara* Saussure, 1874
Paraloboptera sillemi Hanitsch, 1935

5 ♂ 3 ♀ 6 larvae Kerman, Iran, 16. VIII. 1956, leg. Takaya & Azuma
1 ♀ Chaman, Afghanistan, 2. VI. 1955
2 ♂ Kabul, Afghanistan, 16. VI. 1960, leg. Yosii
3 larvae Kabul, 29. VI. 1960, leg. Yosii

This seems a common house-hold pest inhabiting southern states of USSR, Kashmir, Afghanistan, Iran, Irak, Arabia, Egypt, Sudan, Cyrenaica, etc. The whole insect of both sexes and the male genitalia are illustrated here.

3. **Blatta (Shelfordella) gussakovskii** Bey-Bienko Pl. I, fig. 4 ; Text-fig. 5, 6, 7.

Shelfordella gussakovskii Bey-Bienko, Fauna USSR, Blattodea, p. 134, figs. 36g, 41, 42b, 43, 1950 (South Tadjikstan, Afghanistan : Kabul)

Blatta (*Shelfordella*) *gussakovskii* Princis, Beitr. naturk. Forsch. SW-Deutschl., 19(3), 270, 1961 "2 ♂ ♂ Afghanistan, Kabul-Sarabi, 1953, O. Volk leg."

1 ♂ Kabul, Afghanistan, 10. VII. 1955.

3 ♂ 1 ♀ 2 larvae Kabul, Afghanistan, 16. VI. 1960 ; 1 larva do., 29. VI. 1960, leg. Yosii.

The female insect resembles to that of the preceding species, but can readily be separated by the shape of the fore-wing (text-fig. 7) and by the absence of yellow stripe in the costal space.

Bey-Bienko stated the specimen of Afghanistan are somewhat smaller in size and the subgenital plate is slightly incised at the distal margin, but our specimens agree quite well with his original description.

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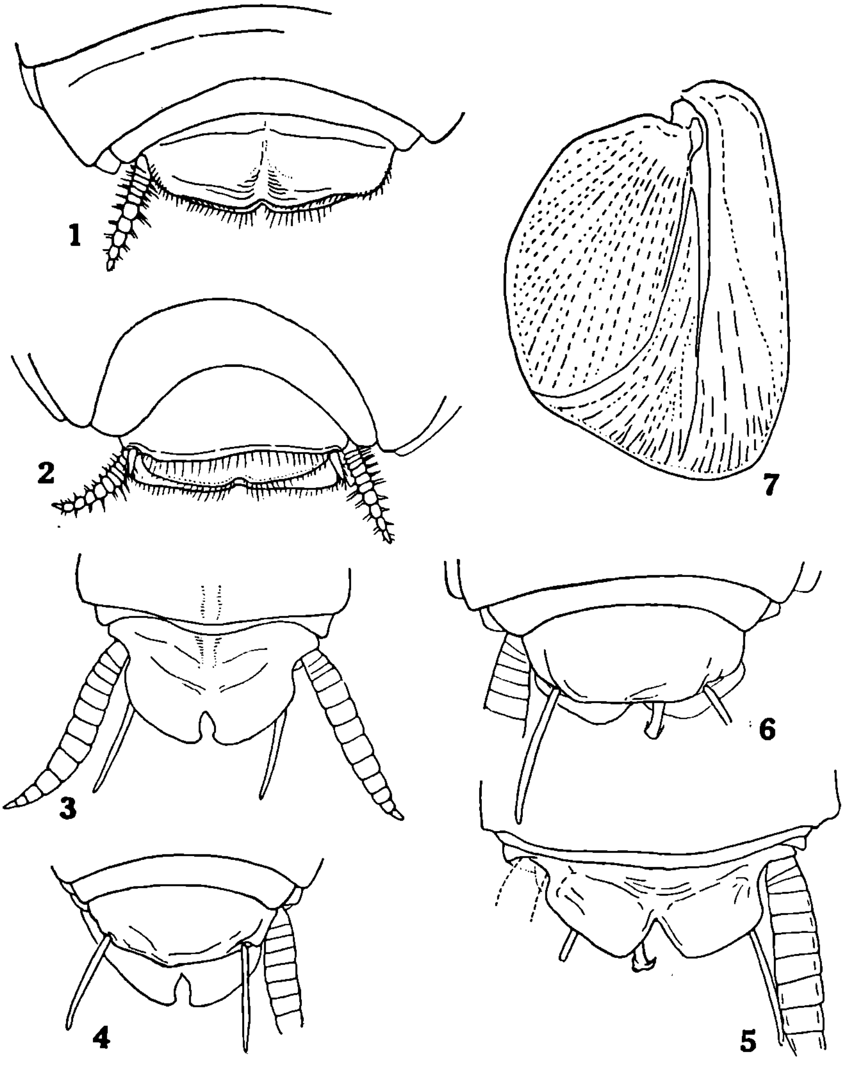

Text-fig. 1. *Polyphaga saussurei* ♂, abdominal end, dorsal view. 2. Do., ventral view. 3. *Blatta (Shelfordella) lateralis* ♂, abdominal end, dorsal view. 4. Do., ventral view. 5. *Blatta (Shelfordella) gussakovskii* ♂, abdominal end, dorsal view. 6. Do., ventral view. 7. Do., ♀, right fore-wing, dorsal view.

In working out these specimens I am indebted to Dr. K. Princis, Lund, and Dr. E. Swirski, Beit-Dagan, for their kind helps in the literature.

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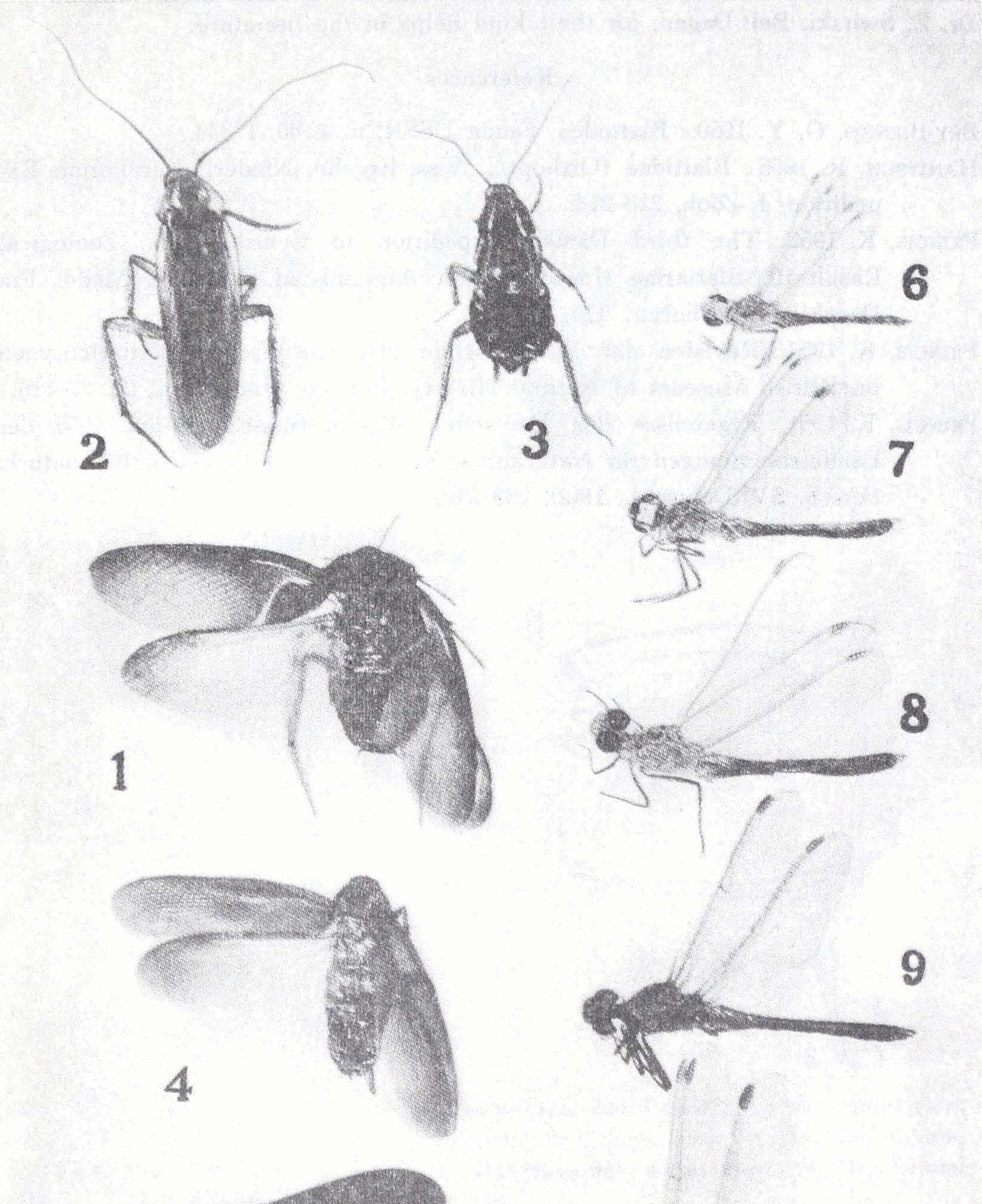
Plate I.



1. *Polyphaga saussurei* ♂, Iran. 2. *Blatta (Shelfordella) lateralis* ♂, Iran. 3. Do. ♀, Iran. 4. *Blatta (Shelfordella) gussakovskii* ♂, Afghanistan. 5. *Calopteryx intermedia persica* ♂ wings, Afghanistan. 6. *Sympetrum vulgatum flavum* ♂, Ishkashim, 2500m. 7. Do. ♂, Ishkashim. 8. Do. ♂, Bazghilan, 2700m. 9. *Sympetrum vulgatum* ♂, Hungary. 10. *Sympetum vulgatum imitans* ♂, Manchuria.

The Afghan Odonata taken by Dr. YOSII in 1960

By

Syoziro ASAHINA*

During the Kyoto University Afghanistan Expedition Dr. Riozo Yosii collected a number of dragonflies which were subsequently forwarded to me for identification.

The Odonata of Afghanistan were recently very thoroughly enumerated by Dr. E. Schmidt, Bonn, based on a rich material taken by Mr. J. Klapperich, Dr. H. G. Amsel, Dr. K. Lindberg and others. This author listed in total 61 species from the limits of this area. Although Dr. Yosii's collection, 17 species in 82 individuals, are, excepting one, *Ischnura fountainei*, all contained in Dr. Schmidt's list there are, however, a number of interesting facts which will be noted under each the species.

Before going any further the author wishes to express his cordial gratitude to Dr. Yosii and Dr. E. Schmidt, Bonn, for their helps given during this study.

I. Agrionidae

1. **Ischnura fountainei** Morton

3♂2♀ Kunduz, 3. VII. 1960.

A North African and Asia Minor species but has not been recorded from Afghanistan by Schmidt.

2. **Ischnura elegans pontica** Schmidt

1♂2♀ Kabul, 22. VI. 1960 ; 3♂2♀ Kabul, 23. VI. 1960 ; 1♀ Suffian, 12. VII. 1960.

This seems to be common around Kabul, Schmidt also recorded many individuals from East and South Afghanistan.

Here the author has to correct some misidentifications of his previous report (1963, pp. 47-48).

a. One female of "*Ischnura elegans ebneri* Schmidt" from Passargadae revealed to be *Ischnura evansi* Morton.

b. "*Ischnura elegans pontica* Schmidt" should be read as *Ischnura fountanei* Morton.

c. "*Ischnura* sp." should be read as *Ischnura pumilio* Charpentier.

3. **Enallagma risi** Schmidt

1♂ Suffian, 12. VII. 1960.

This is a representative of *Enallagma deserti*-group. As this single specimen is not well preserved I follow here Schmidt's name *risi* which was taken at Achmede Dawane (Schmidt, 1961, p. 409) not far apart from Suffian, East Afghanistan.

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II. Lestidae

4. **Lestes barbarus** (Fabricius)

1♂ Kabul, 19. VI. 1960 ; 3♂ Kabul. 20. VI. 1960.

Already recorded from Kabul in the author's previous report (1963, p. 45).

III. Calopterygidae

5. **Calopteryx intermedia persica** Bartenef

2♂ Kishim, 5. VII. 1960.

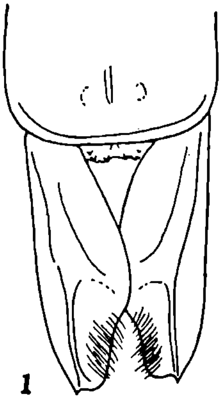
Schmidt (1955) published a detailed study of the *splendens*-group of the genus *Calopteryx* and recorded (1961) *intermedia persica* from northwestern Afghanistan. Our specimens taken at Kishim, northeast Afghanistan, may be treated as the same with it. A photo of the wings will be given here (Pl. I. fig. 5).

IV. Aeschnidae

6. **Anax parthenope parthenope** (Selys)

1♂1♀ Kabul, 23. VI. 1960.

When compared with the other Afghan specimens (cf. Asahina, 1963, p. 40) the superior caudal appendages of the male are broader and the female occipital tubercles are much more protruded (Text. fig. 1, 2), but these may reasonably fall within individual variation of this westpalaearctic subspecies.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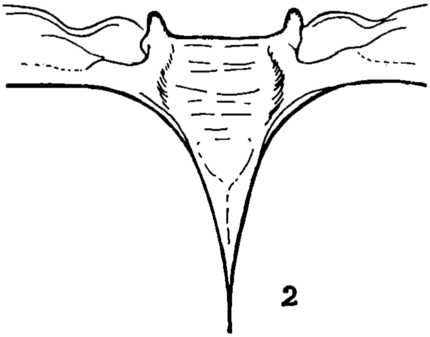
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Text-fig. 1. *Anax parthenope parthenope*, Afghanistan ♂, caudal appendages.
Text-fig. 2. Do. ♀, occipital triangle.

7. **Aeschna juncea mongolica** Bartenef

1♂ Ishkashim, 15. VII. 1960.

A pale-bodied form of this holoarctic species the colouration of which may perhaps be related to dry climate. The pterothoracic yellow lateral bands are broader, and their dark outlines are very poorly developed. This subspecific name was used again here after Bartenef (1929) and Schmidt (1961).

V. Libellulidae

8. **Orthetrum sabina sabina** (Drury)

3♀ Kunduz, 3. VII. 1960.

Small (hindwing 30-32mm) and paler in general colouration. Schmidt recorded this species from the same locality, Kunduz, 600m.

9. **Orthetrum albistylum albistylum** Selys

1♂ (ad.) Kunduz, 3. VIII. 1960.

Size definitely smaller (hw. 34mm) than the East Asiatic race, *speciosum* Uhler. The black stripes of the body are exceedingly reduced and the wing apices being entirely hyaline.

10. **Orthetrum brunneum brunneum** Fonscolombe

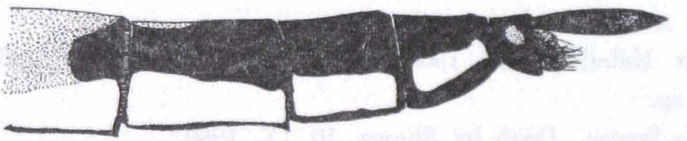
2♂6♀ Bazghilan, 14. VII. 1960 ; 1♂ Istalif, 26. VI. 1960.

A dry land species ranging from the Mediterranean coast to Jehol of North China. Afghan specimens are smaller (hw. 28-31mm) than European or Chinese (hw. 33-35mm) ones.

11. **Libellula quadrimaculata grigorievi** Schmidt

6♀ Bazghilan, 14. VII. 1960.

Schmidt (1961) established *grigorievi* based mainly upon the character that yellow marginal spots are present on the ninth abdominal segment of male insects. The present materials are unfortunately all females, so I tentatively use the same subspecific name leaving a detailed discussion to a future occasion. The abdominal markings of the female will be given here (Text-fig. 3). Hindwing length 31-33mm. One specimen belongs to the "forma *praenubila*".



Text-fig. 3. *Libellula quadrimaculata gregorievi*, Afghanistan ♀, distal abdominal segments, lateral view.

12. **Crocothemis erythraea** (Brullé)

1♂ Suffian, 12. VII. 1960 ; 7♂1♀ Kunduz, 3. VII. 1960.

As Schmidt has discussed these are very small in size, hindwing length being 24-26mm.

13. **Sympetrum fonscolombei** (Selys)

1♂ Suffian, 12. VII. 1960 ; 2♂ Kabul. 22. VI. 1960 ; 1♀ Kabul, 23. VI. 1960.

An arid zone species ranging from Africa to Liantung Peninsula (Dairen), North China.

14. **Sympetrum striolatum striolatum** (Charpentier)

3♂1♀ Kabul, 16. VI. 1960 ; 1♀ Kabul. 17. VI. 1960 ; 1♀ Kabul, 28. VI. 1960 ; 1♂ Kabul, 23. VI. 1960.

All the specimens are teneral and have a rather constant hindwing length 29–30mm.

15. **Sympetrum meridionale** (Selys)

1♂3♀ Kabul, 16. VI. 1960 ; 1♂ Kabul, 17. VI. 1960 ; 1♀ Kabul. 20. VI. 1960 ; 1♀ Kabul, 19. IX. 1960.

This seems very common around Kabul, the body colour is very pale as Schmidt emphasized.

16. **Sympetrum vulgatum flavum** Bartenef

6♂1♀ Ishkashim, 25. VIII. 1960 ; 1♂1♀ do., 25. VIII. 1960 ; 1♂1♀ do., 31. VIII. 1960 ; 1♂ Bazghilan, 14. VII. 1960.

As has been discussed by Dr. Schmidt the dimensional difference due to the locality is remarkable. Individuals from Ishkashim, 2500m, are small with hindwing ♂ 18–23, while a male insect from Bazghilan, 2700m, has 26.5mm.

The largest race of *Sympetrum vulgatum* may be *vulgatum imitans* of North China. A comparison of the size will be shown by the photographs given here (Pl. I, Fig. 6–10).

A similar but less remarkable case may be seen in *Symptrum parvulum*, where a large Japanese specimen has the hindwing length 27mm against a small Japanese or Manchurian examples 20–22mm.

Larval specimens

a. *Sympetrum striolatum* (supposition)

3 ult. instar Kabul, 24. VI. 1960 ; 1 exuvium Istalif, 24. VI. 1960.

b. *Orthetrum* sp.

3 immature larvae Doab by Shewa, 10. IX. 1960.

c. *Ischnura* sp.

3 immature larvae Doab by Shewa, 10. IX. 1960.

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In addition to the items listed in my previous report (Asahina, 1963, p. 49) the following works were referred.)

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On a Cestode collected from a Goat of Afghanistan

By

Tamao FUKUI

In 1960, some members of the Department of General Education of the Kyoto University accomplished a research exploration journey in some districts of Afghanistan under the leadership of Prof. Dr. Ryozo Yosii. By this time a large cestode was collected from the intestine of a goat at Istragh Wakhan situated near the boundery of C. S. S. R. I was requested for identification of the worm. The following short report is based on this material.

The worm preserved in formalin was in good condition. But, unfortunately, the scolex was lacking and I could not get decisive identification. Consulting the structure of some plogrottides, however, I believe this worm must be *Moniezia benedeni* (MONIEZ, 1879) BLANCHARD, 1891.

Many species of this genus were, hitherto, reported chiefly from the intestine of ruminants. In Japan two species, namely *M. expansa* and *M. benedeni* were reported by Dr. Sadao Yoshida, Dr. Satyu Yamaguti and others. According to Wardle and Mcleod's book (The Zoology of Tapeworms, 1952) three other species excluding two species above mentioned are denoted. They are *M. pallida* from horses in South Africa. *M. monardi* from an antelope (*Redunca amadirum*) in Angola, West Africa denominated by Fuhrmann and *M. mattami* from the wart hog (*Phacocaerus aethiopicus*) in Uganda given by Baylis. Other fourteen species reported by many authors were arranged in the list of synonyms of *M. expansa* and *M. benedeni.* Concerning present material, I think it is sufficient to refer the last two species only. As Dr. Yamaguti gave minute descriptions and excellent figures in his paper, so I examined my preparations of the worm referring his paper. But some differences were found in his report comparing that of Dr. Yoshida and also my material do not completely agree to these descriptions. Consulting various characters of my worm, I think it would be reasonable to identify it *Moniezia benedeni.*

Description of the present material.

(Concerning entrails different points from others are given only).

Colour : A little creamy white (Material in formalin).

Total length : Presumably ca. 1,5 m. (The material was very much entangled and I could not untie it without damage.)

Width : The largest ca. 12 mm, the smallest ca. 4 mm.

Thickness : Lesser than 1 mm.

Ratio of length and width of proglottides.

Proglottis with ripe genital organs ca. 1 : 7.

Proglottis with the largest width ca. 1 : 10.

Proglottis with the smallest width ca. 3 : 5.

Interproglottidal gland : Not clearly seen.

Distribution of testes : Almost arranged posterior to the middle transverse line of proglottis. In both side, however, extend somewhat anteriorly.

Cirrus pouch : Thin-walled, small.

Vitellarium : Rosette-like, not compact.

Host : According to The Zoology of Tapeworms *M. expansa* is found in lamb, while *M. benedeni* is cosmopolitan and frequent in cattle than lamb. Dr. Yoshida wrote the former is frequently found in sheep and cattle but rarely in goat in Europe and America and it is found in Japan also. Japanese antelope (*Capricornis crispus*) and Japanese deer (*Cervus nippon nippon*) also are infested by this worm. *M. benedeni* is more commonly found in cattle than in sheep in Japan. Dr. Yamaguti's materials were collected from cattle at Kyoto abattoir.

The origin of goat, now reared all over the world, is said a hybrid of wild goat of Small Asia or Iran and that of Afghanistan. If these wild goats were infested by this cestode since ancient times it is very interesting that this material collected by Dr. Yosii and his colleagues is a very valuable specimen. Taking this opportunity, I want to denote my hearty thanks to them that I can examine this precious material.

Getting permission of Dr. Yosii, a part of this material may be preserved in the Meguro Parasitological Museum directed by Dr. Kamagai, Meguro, Tokyo and preparations are preserved in my hand.

Some abnormal proglottides were found in the preparations and they are shown in figures.

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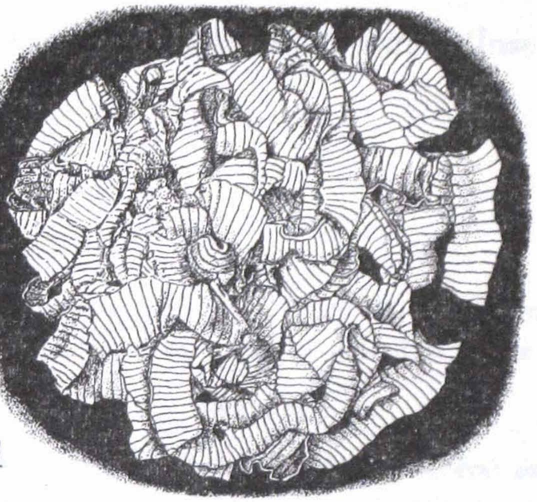

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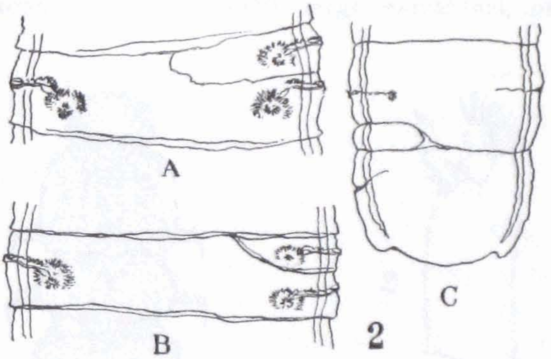

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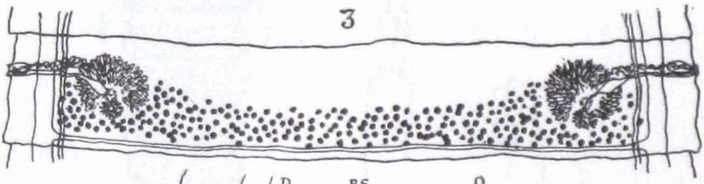

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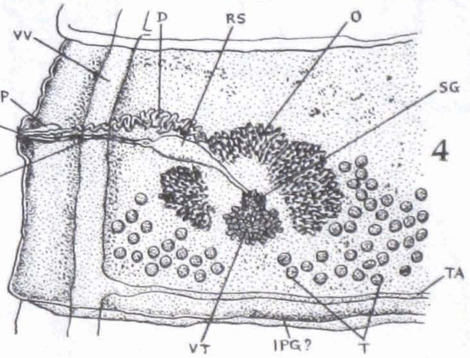

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Explanation of Figures

1. Total view of the very much entangled specimen.
2. Three examples of abnormal proglottides.
3. Diagrammatic figure of a ripe proglottis.
4. Magnified figure of the genital organs.

Abbreviations used in Figures

CP.	cirrus pouch	SG.	shell gland
D.	vas deferens	T.	testis
GP.	genital pore	TA.	transverse anastomosis
IPG.	intergroglottidal gland	VG.	vagina
O.	ovary	VT.	vitellarium
RS.	receptaculum seminis	VV.	ventral excretory vessel

An Elmidae Larva from Afghanistan, Pamir (Insecta-Coleoptera)

(1 text-figure)

By

Kyuemon Gose*

Among the aquatic insects collected by Dr. R. Yosii from Afghanistan, I found one species of Elmidae larva, which is described in the present paper.

Elmis sp.

A single larva. Body length 2.4mm (Fig. 1·1). General colour buffy brown. Body cylindrical, dorsum convex, without large elevations, nearly triangular in

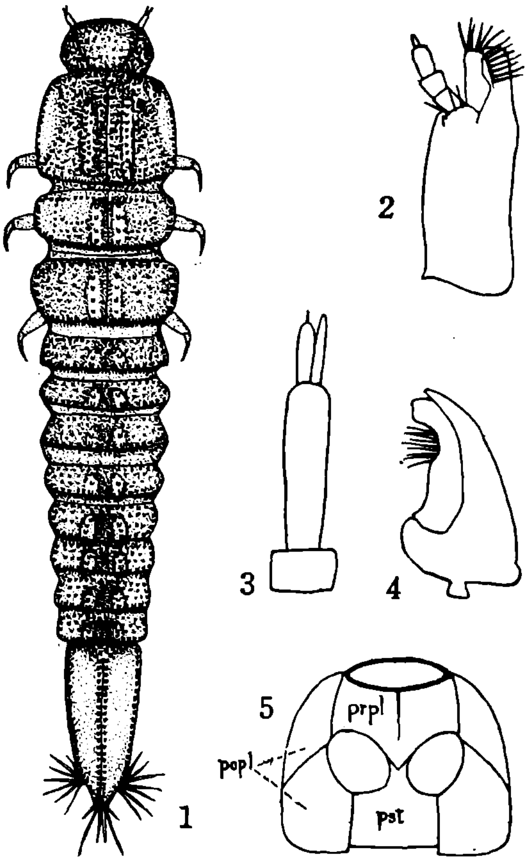

Fig. 1 Elmis sp., larva
1. dorsal view of the larva ; 2. maxilla ; 3. antenna ; 4. right mandible ; 5. prosternum (pst = posterior sternum, prpl = prepleurite, popl = postpleurite).

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* Gojo High School, Gojo, Nara Prefecture.

cross section.

Head subquadrangular, flattened ventrally. Mandible (Fig. 1·4) robust, with two apical teeth. Maxilla (Fig. 1·2) well developed, maxillary palp with four joints, ratio of their length from base to tip as follows ; 5 : 5 : 7 : 2, terminal joint rudimentary. Antennae (Fig. 1·3) with three joints ; segment in approximate ratio of 1 : 4.8 : 1.5, first segment short, nearly quadrangular and shorter than wide ; second segment the longest and clavate ; third segment consists of two rod-like structure, they are shorter and narrower than the second segment ; one is longer than the other ; a bristle present at the apical end of the shorter rod. All dorsal surface of head, thorax and abdomen. Ventral side of prothorax is as Fig. 1·5. The last abdominal segment long, subtriangular, its cross section is triangular, on the dorsal surface along the outer edge and along the median suture there are 4 rows of granules, the basal part of the segment is also granulated. Abdominal segments (except the last segment) without tergal sutures. Pronotum, mesonotum and metanotum as well as first to eighth abdominal segments with a swelling on each side of median ecdysial line. Apex of last tergite slightly emarginate, produced at each outer angle. There are three tufts of gill filaments at the posterior part of the last segment.

Material : One larva, obtained by Dr. R. Yosii from the mountain stream at Kokcha in Bazghilan, Afghanistan, on July 14th, 1960.

A Whistle-like Bone from Kunduz Castle, Northern Afghanistan

By

Yoshikazu HASEGAWA*

Some animal bones obtained by the Afghanistan Expedition 1959 were submitted to the present author for examination through the courtesy of Professor Riozo Yosii of Kyoto University. The material, consisting of *Equus* sp. (middle size), *Canis familiaris* Linné and *Gazella* sp., was collected at the Kunduz castle site in northern Afghanistan. Of these, the gazelle bone is of particular interest as an artifact and is reported herewith.

Description of artifact metacarpus : This metacarpus appears to belong to a kind of gazelle in view of the characters and size given below.

Front side of the specimen : the proximal end is broken, the distal end is divided into two parts by the sagittal notch of oval shape, vascular groove being undeveloped and the foramen on this surface very small, with diameter 1 ~ 1.5 mm. The lateral view of the specimen is considerably flat. Posterior side : the proximal end is more broken than that of the front side. On this side, a very round hole exists near the proximal end of the sagittal notch (at about 6.5 mm from the latter). The diameter is about 6.5 mm. Toward the distal part, the hole is partly broken. This hole was probably made by human hand.

Measurments of the specimen (in mm.)

Maximum length	93.9+
Maximum width at the condyle	26.3
Maximum thickness at the condyle	16.6
Maximum thickness at the body	14.4

We have good knowledge of the bone examples that were pierced by human hand, but such instances as the Kunduz specimen are extremely scarce.

In 1924, Lillian Eichler illustrated a double whistle that was made of the tibia of a deer and three other whistles ; all these were found in an ancient Indian grave at Santa Barbara, Calif. Another example of bone whistle is shown with a figure in a paragraph on musical instruments in the handbook edited by Frederich Webb Hodge (1907). A. L. Kroeber (1925) also reported as follows : "A bone whistle used in the Deerskin dance——".

It is my judgement that this Kunduz specimen is the same sort of bone whistle as the American Indian ones. On the other hand, it differs from the above artifacts for the following reasons : the hole is open at the end of the body and whistles are not usually made from cannon bones.

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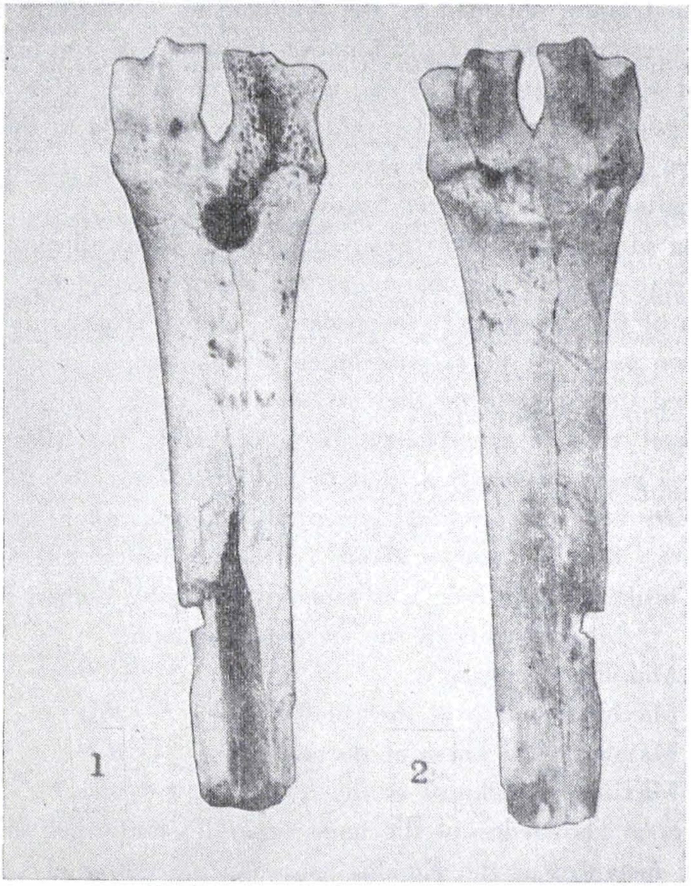
* Department of Paleontology, National Science Museum, Tokyo.

I am grateful to Professors Seiichi Mizuno, Shinobu Iwamura, and Riozo Yosii, Kyoto University and Dr. Hitoshi Watanabe and Dr. Banri Endo, Tokyo University, for granting me the privilege to study and report on this material. I also thank the members of the Academic Alpine Club Kyoto for giving me the opportunity to study their specimens.



Explanation of figures

Fig. 1. Metacarpus with a hole near the articular part, posterior view. X 1/1
Fig. 2. The same, anterior view. X 1/1

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Report on Freshwater Planaria from Afghanistan[1, 2]

By

Atsuhiko ICHIKAWA* and Masaharu KAWAKATSU*

Dr. R. Yosii of Yoshida College, Kyoto University, a member of "The Japanese Pamir Expedition, 1960" made by "The Academic Alpine Club of Kyoto", entrusted the present writers with his collection of freshwater planaria of Afghanistan. The material, which was fixed on the field in absolute alcohol plus a certain quantity of acetic acid, consisted of seven vials of specimens in alcohol. Those about ninety specimens are examined under a low power microscope; several specimens proved to be in a sexually mature state. We also have made a series of sections of all specimens. It was then seen that the contents of the vials are all of one species, *Polycelis pamirensis* De Beauchamp.

A taxonomic study of this planarian species from Afghanistan has already been performed by De Beauchamp (1961). Therefore, it is attempted in this paper only to present some additional description based upon the observation of our material.

The writers are indebted to Professor Dr. Riozo Yosii who kindly handed to them this valuable material. Also for bibliographic help gratitude is expressed to Professor P. De Beauchamp of the Laboratoire d'Evolution des Etres organisés, Paris, France.

List of Localities

The stations labelled No. 1 ~ No. 7 are located to the northeast of Kabul, Badakhshan, Afghanistan. The following remarks give the data found on the labels in the vials together with the writers' own notes from examination of the specimens.

No. 1. Cold-water brook at Borak (Lat. 36° 55′ N. and Long. 70° 50′ E.). Altitude, 2000 m. July 9, 1960. Eleven small specimens, 5-8 mm long and 1.5 mm broad, none of which appears to have sex organs. Specimen No. 306 a-k.

No. 2. Cold-water brook at Ishkashim (Lat. 36° 45′ N. and Long. 71° 35′ E.). Altitude, 2500 m. August 29, 1960. Two small specimens, 5-7 mm long and 1 mm broad, not sexual. Specimen No. 308 a and b.

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[1] Contribution No. 562 from the Zoological Institute, Faculty of Science, Hokkaido University, Sapporo, Japan.

[2] This paper was presented at the XIVth Annual Meeting of the Hokkaido Branch of the Zoological Society of Japan, Sapporo, August 25th, 1962.

* Zoological Institute, Faculty of Science, Hokkaido University, and Biological Laboratory, Fuji Women's College, Sapporo.

No. 3. Clean but mossy cold-water brooklet at Ishkashim. Altitude, 2500 m. August 30, 1960. This vial contains 26 good-sized specimens and several fragments of broken worms. The biggest specimen is 15 mm long and 2.5 mm broad, the moderate ones, 10-13 mm × 2 mm. Thirteen of the largest are seen to be sexually mature but 2 of them proved to be not fully mature. Specimen No. 309 a-z ; and 5 head pieces of whole mounts (1 slide).

No. 4. Cold-water spring near the lower end of the Qazi Deh Glacier, Mt. Noshaq (C_1 of the Japanese Expedition ; Lat. 36° 25′ N. and Long. 71° 50′ E.). Altitude, 3800 m. July 25, 1960. Rather small specimen, 8 mm long and 2 mm broad, not sexual. Specimen No. 310 a.

No. 5. Spring-fed brooklet near C_1, Mt. Noshaq. Altitude, 3800 m. July 25, 1960. Eleven specimens, 8-10 mm long and 2 mm broad, and 1 head fragment. Only 1 specimen proved sexual but not fully mature. Specimen No. 311 a-l.

No. 6. Spring-fed brooklet near C_1, Mt. Noshaq. Altitude, 3800 m. August 26, 1960. Twenty-six middle-sized specimens, 8-10 mm long and 1 mm broad, all asexual. Specimen No. 312 a-x ; and 2 specimens of whole mounts (1 slide).

No. 7. Clean cold-water brook near Lake Shewa (Lat. 37° 20′ N. and Long. 71° 20′ E.). Altitude, 3000 m. September 9, 1960. Twelve middle-sized specimens, 8-10 mm long and 1 mm broad, all asexual, including several specimens in fission. Specimen No. 307 a-l.

Family PLANARIIDAE

Genus **POLYCELIS** Ehrenberg, 1831

Polycelis pamirensis De Beauchamp, 1961

External Characters : According to Dr. Yosii's communication, the size of this species appears to be moderate, probably not exceeding 20 mm in living state. He also made a brief sketch of a living worm of this species on the spot (Fig. 1 A). As is shown in the sketch, the frontal margin is slightly convex and provided laterally with two rather blunt but prominent auricles. Behind the auricles, the body incurves slightly, then gradually widens toward the pharyngeal region finally tapering toward the moderately rounded posterior end. Figure 1 (B and C) gives the appearance of somewhat contracted specimens in alcohol from two different localities. Judging from these sketches, the head has much the same shape as that of the Japanese *Polycelis auriculata* Ijima et Kaburaki (cf. Ichikawa & Kawakatsu 1961, Pl. I, Fig. 4).

The pharynx of this species is rather long ; it is inserted at about the middle of the body. The copulatory organs occupy more than half the postpharyngeal region.

According to Dr. Yosii's observations made on the spot, they approach to black in color. In the presented specimens the color of the integument has become a pale brown with light greyish borders. On the dorsal side two indistinct dark longitudinal lines are often observed on either side of the median line, with paler areas above the pharynx and the copulatory organs. In most specimens the ventral side is paler than the dorsal side.

As a generic character of the genus *Polycelis*, this species has many small eyes which form a horse-shoe-shaped band along the frontal margin of the head, the base of the auricles and the lateral margins of the body, terminating shortly behind the auricles. Within this band the eyes are distributed irregularly ; anteriorly they are placed in more than one row, somewhat irregularly scattered ; behind the head they are in several rows. Frequently there are no eyes in the middle portion of the head margin. The photographs in Figure 2 (A-D) indicate the arrangement of the eyes in four specimens (probably 1 sexual and 3 asexual) from Ishkashim and Mt. Noshaq.

The number of eyes varies considerably. In specimens of different size, both mature and immature, collected in five localities, the numbers were counted as in Table 1.

From the data given in Table 1, it will be seen that asxual worms possess fewer eyes than sexual ones, consisting of 30 to 70 in the smallest worms, 80 to 100 in medium-sized ones, and 110 to 150 in the largest worms. The enumerations obtained from the present material are essentially similar to those described from De Beauchamp's material (cf. 1961, pp. 79-82 ; Fig. 1 A and B).

Internal Characters : The pharynx of *Polycelis pamirensis* has the structure typical of the family Planariidae : the circular and longitudinal muscle layers of the inner muscular zone are distinctly separated into two layers. In the fully mature specimens, the anterior intestinal trunk bears 6 to 8 lateral branches ;

Table 1

Group of specimens classified according to localities	No. of specimens examined and their sexual state	Body length x width (mm)	Number of eyes*		
			Minimum on one side	Maximum on one side	Total no. of eyes
Borak (No. 306)	6, asexual	5~ 8 x 1.5	28	44	60~ 82
Ishkashim (No. 309)	14 (5, sexual	15 x 2.5	51	80	110~153
	(9, asexual	10~13 x 2	39	75	81~145
Mt. Noshaq (No. 311)	4, asexual	8~10 x 2	24	40	54~ 78
Mt. Noshaq (No. 312)	16, asexual	8~10 x 1	15	39	34~ 73
Lake Shewa (No. 307)	3, asexual	8~10 x 1	28	58	63~111

* Errors may have occurred in the count because sometimes the eyes are arranged very densely.

each posterior trunk bears about 15 or more pairs of lateral branches.

The ovaries, a pair of rounded compact masses, are situated in the usual anterior portion (Fig 3(A)). The yolk glands (or vitellaria) have the usual appearance and occur from the level of the ovaries to the posterior end of the body.

The numerous, fairly large testes occupy the position typical of the genus *Polycelis*. Namely, they are arranged in two zones, extending near the ventral surface from the ovaries to the base of the pharynx on either side of the anterior intestinal trunk (Fig. 3 (B and C)). Many of the sexually mature specimens are in active spermatogenesis. The two sperm ducts form the usual tubular enlargements (or the spermiducal vesicles), are found on either side of the pharynx and the copulatory bursa. The sections of the fully mature worms show that their spermiducal vesicles contain sperm.

Concerning the anatomy and histology of the copulatory organs, there are no noticeable differences between the present material and that of De Beauchamp (cf. 1961, pp. 81-82, Fig. 2 A and B). Sagittal sections of the copulatory apparatus of two of the Ishkashim specimens are shown in Figure 4 (A and B). Figures 5 (A, B, C and D) are photomicrographs of the copulatory apparatus of four specimens from the same locality. De Beauchamp's figure (op. cit., p. 82, Fig. 3) of the penis of the Doavi specimen of *Polycelis pamirensis* shows a hypertrophied bulbar cavity, a papilla with rather thin musculature and the lanky tip of the papilla extending into the long funnel-shaped male antrum. In the penial anatomy of our material, however, no such aberrant aspect of the penis can be found.

In short, *Polycelis pamirensis* differs from other species of *Polycelis* in the following details of the copulatory apparatus : penis with large bulb and rather small bulbar cavity ; penis papilla well-developed, moderately long, pointed ; sperm ducts entering the penis bulb separately ; ovovitelline ducts uniting into a common duct that enters the roof of the male antrum ; copulatory bursa extraordinarily large, with bursal canal of moderate length ; distal part of the bursal canal thick-walled, muscular, and thickly provided with eosinophilous glands.

Remarks on Affinities : Search through the literature reveals that a good number of species of the genus *Polycelis* from the central part of the Asian Continent have been described. The species are : *Polycelis koslowi* (Zabusov, 1911) from Tibet ; *Polycelis tibetica* Hyman (1934 ; including *Sorocelis* sp. Meixner et Muth, 1911 and *Sorocelis* sp., Stewart 1911, p. 68) from Kashmir and Indian Tibet ; *Polycelis pathan* De Beauchamp (1959) and *Polycelis pamirensis* De Beauchamp (1961) from Afghanistan ; *Polycelis receptaculosa* (Livanow et Zabusova, 1940) from the vicinity of Lake Teletzkoë in the Altai Mountains ; *Polycelis eburnea* (Muth, 1912) from the Aral Sea region ; *Polycelis sabussowi**[1] (Seidl, 1911) from Turkestan, and *Polycelis kulsaika* Zabusova-Zudanova (1947) and *Polycelis alma-atina* (Zabusova-Zudanova, 1947) from Kazak, South-west Russia. Two species that may belong to the genus are also known : *Polycelis ? tibetica* (Zabusov, 1911, pp. 349-350, Taf. II, Fig. 1) from Tibet and *Polycelis* sp. Kato (1950, p. 189, Fig. 3) from Sanshi in North China. However, the fully sexually mature specimens of the above two species have not been studied yet from the modern taxonomic viewpoint.

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*1. Seidl's species, *Sorocelis lactea* and *Sorocelis stummeri*, are included in this species (cf. Kenk 1936, pp. 76-80, 1953, p. 172).

Recently, a subspecies, *Polycelidia koslowi eburnea* from Stalinabad and the Obisolibur River in Tadzhik, South-west Russia, has been reported by Dr. N. A. Porfirjeva of Kazan University (1960, pp. 122-138, Figs. 1 and 2). According to her opinion, Hyman's *Polycelis tibetica* should be reduced to a subspecies of *Polycelidia koslowi* and the nominative form then becomes *Polycelidia koslowi koslowi* (op. cit., pp. 130-131).

Kenk (1953, pp. 171-172) suggested that the genus *Polycelis* may be subdivided into three subgenera (i. e. *Polycelis*, *Seidlia* and *Ijimia*) on the basis of the structural characters of the copulatory apparatus. On the other hand, the five-fold classification of the genus *Polycelis* (i. e. *Polycelis*, *Seidlia*, *Ijimia*, *Polycelidia* and *Sorocelides*) had been employed by the Russian taxonomists (cf. Livanow & Zabusova 1940, pp. 128-143 ; Zabusova 1929, p. 521, 1936, p. 152 ; and others). However, it is an opinion commonly accepted by many planarian taxonomists that the genus *Polycelidia* which was founded by Livanow & Zabusova (1940, pp. 128-135) may be included under the present definition of the genus *Polycelis* (cf. De Beauchamp 1961, pp. 84-85 ; Hyman 1951, p. 162 ; Kenk 1930, pp. 294-295, 1953, pp. 171-173).

Distribution and Ecology : Up to the present, four species of freshwater planarians have been known from Afghanistan. These species were taken in the expeditions for collecting the animals of Afghanistan made by Doctor K. Lindberg in 1957～1960 ; they are : *Dugesia bactriana* De Beauchamp, *Dugesia lindbergi* De Beauchamp, *Polycelis pathan* De Beauchamp and *Polycelis pamirensis* De Beauchamp (cf. Contribution à l'étude de la faune d'Afghanistan 1 and 67, Lund, 1959 and 1961). According to Dr. De Beauchamp's descriptions, *Polycelis pathan* was collected from Hazārjāt and Parwan, and *Polycelis pamirensis*, from Parwan and Badakhshan (altitude, 1740～3100 m).

Records now available show that the latter species has a rather wide distribution in Badakhshan, North Afghanistan. Dr. Yosii informed the present writers that *Polycelis pamirensis* was found only in very cold and clean waters below the altitude of about 3800 metres. Perhaps it is a stenothermic and rheophilic species. In some localities several specimens exhibited freshly regenerated anterior and posterior ends, indicating that asexual reproduction by fission was taking place. De Beauchamp (1961, pp. 78-79) also observed evidence of the asexual reproduction of this species.

The egg capsule (or cocoon) of this species is not known.

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Note added in proof :

Preliminary report of this article is to be found in Proceedings of the XIVth Annual Meeting of the Hokkaido Branch of the Zoological Society of Japan, pp. 2-3 (1962). Sapporo. (Jap.)

Since this paper was submitted for publication the following papers dealing with the taxonomy and chorology of the Asiatic *Polycelis* species have been published.

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According to De Beauchamp (1963), two species of planarians of Afghanistan, *Dugesia bactriana* and *Polycelis* sp., have been collected by Dr. K. Lindberg in 1962 (loc. Kouh-Djangoui and Kares Naouraki ; alt., 2560 m). In his material of the latter form, however, none of the animals was fully mature.

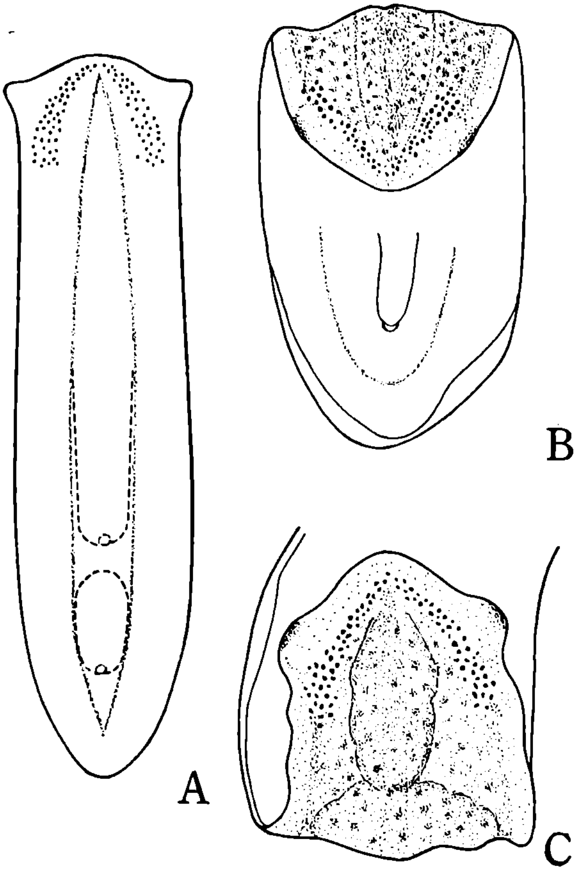

Fig. 1. General appearance of *Polycelis pamirensis.* A : sketch of a living specimen from Ishkashim. B : preserved specimen from Borak (No. 306 group). C : preserved specimen from the Lake Shewa region (No. 307 group).

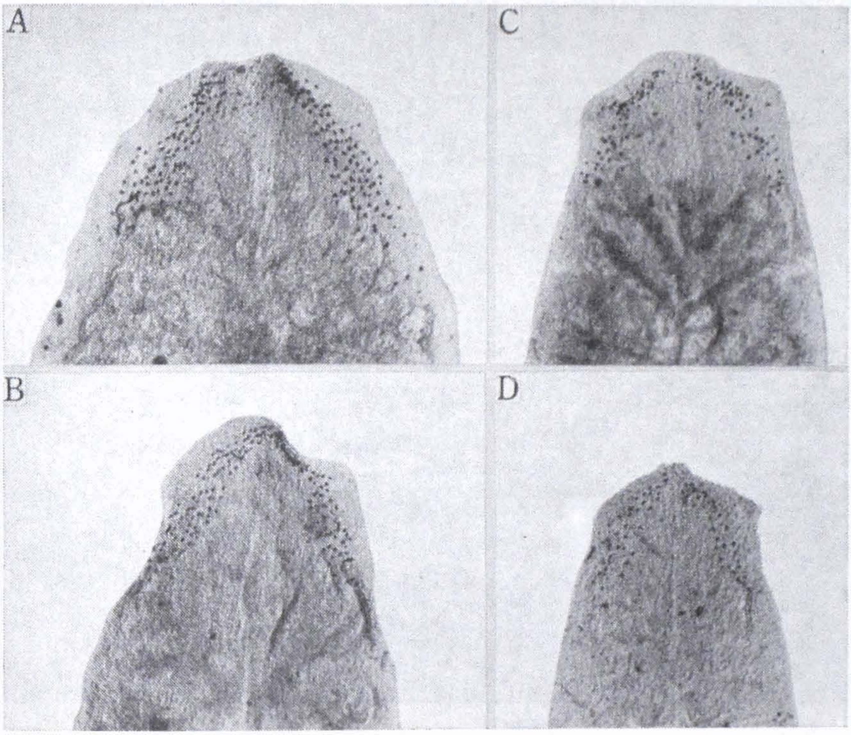

Fig. 2. Photographs showing the eye number and arrangement. All from whole mounts. A : sexual (probably) specimen from Ishkashim (No. 309, fragment). B and C : asexual specimens from Ishkashim (No. 309, fragments). D : asexual specimen from Mt. Noshaq (No. 312 y).

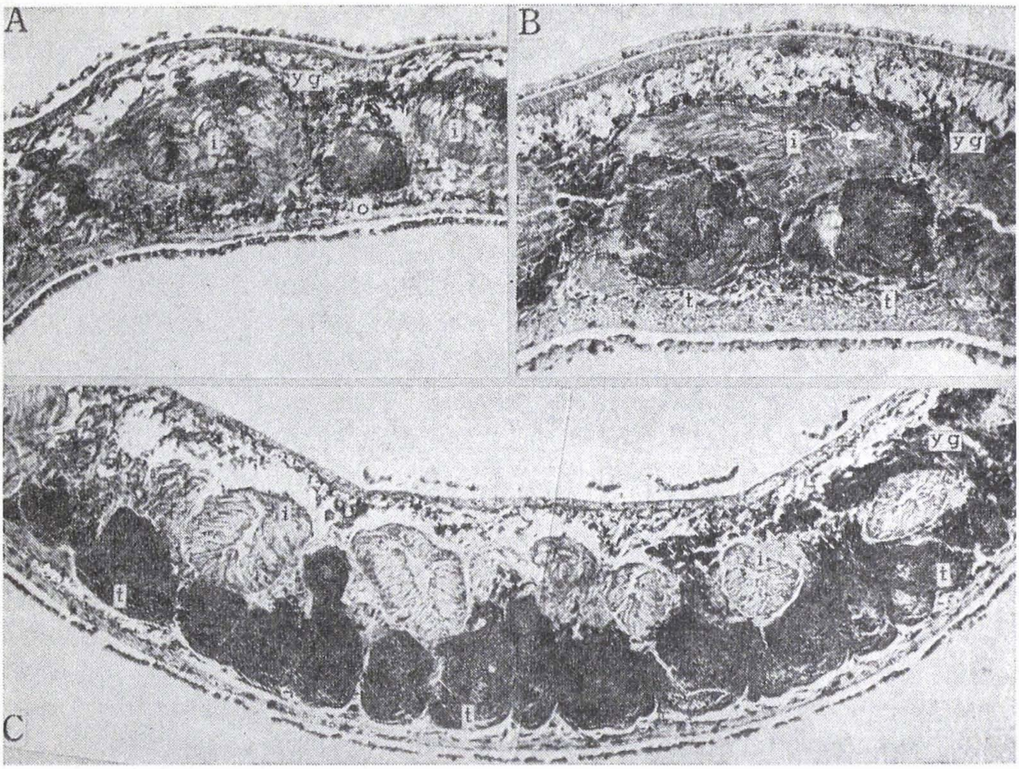

Fig. 3. Reproductive system. All from Ishkashim. A : sagittal section of the prepharyngeal region, showing the situations of ovary and yolk glands (No. 309 g). B : cross section of the prepharyngeal region, showing the situations of testes and yolk glands (No. 309 w). C : sagittal section of the prepharyngeal region, showing the ventral arrangement of testes (No. 309 h). Not fully matured.
i : intestine ; o : ovary ; t : testis ; yg : yolk gland.

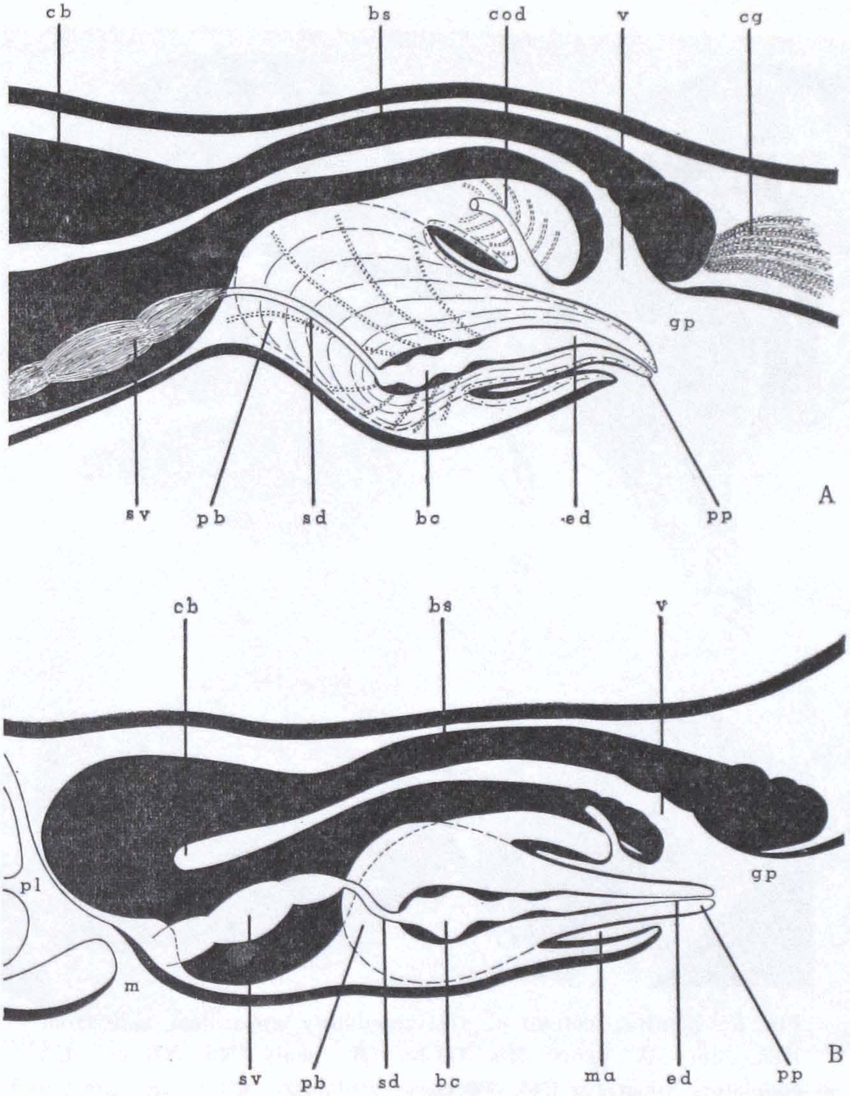

Fig. 4. Diagrams showing the sagittal view of the copulatory apparatus. A : Ishkashim specimen (No. 309 c). See Fig. 5 (B). B : Ishkashim specimen (No. 309 m). Musculatures and glands simplified. bc : bulbar cavity ; bs : bursa stalk ; cb : copulatory bursa ; cg : cement gland ; cod : common ovovitelline duct ; ed : ejaculatory duct ; gp : genital pore ; m : mouth ; ma : male antrum ; pb : penis bulb ; pl : pharynx lumen ; pp : penis papilla ; sd : sperm duct ; sv : spermiducal vesicle ; v : vagina.

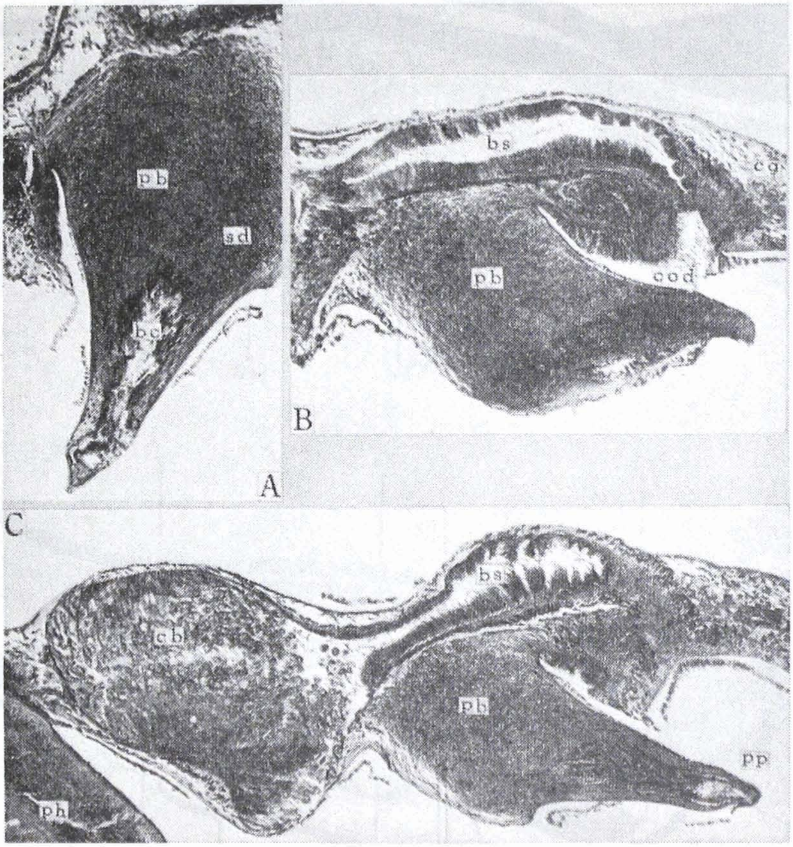

Fig. 5. Sagittal sections of the copulatory apparatus. All from Ishkashim. A : penis (No. 309 b). B : penis (No. 309 c). C : copulatory apparatus (No. 309 e).
bc : bulbar cavity ; bs : bursa stalk ; cb : copulatory bursa ; cg : cement gland ; cod : common ovovitelline duct ; pb : penis bulb ; ph : pharynx ; pp : penis papilla.

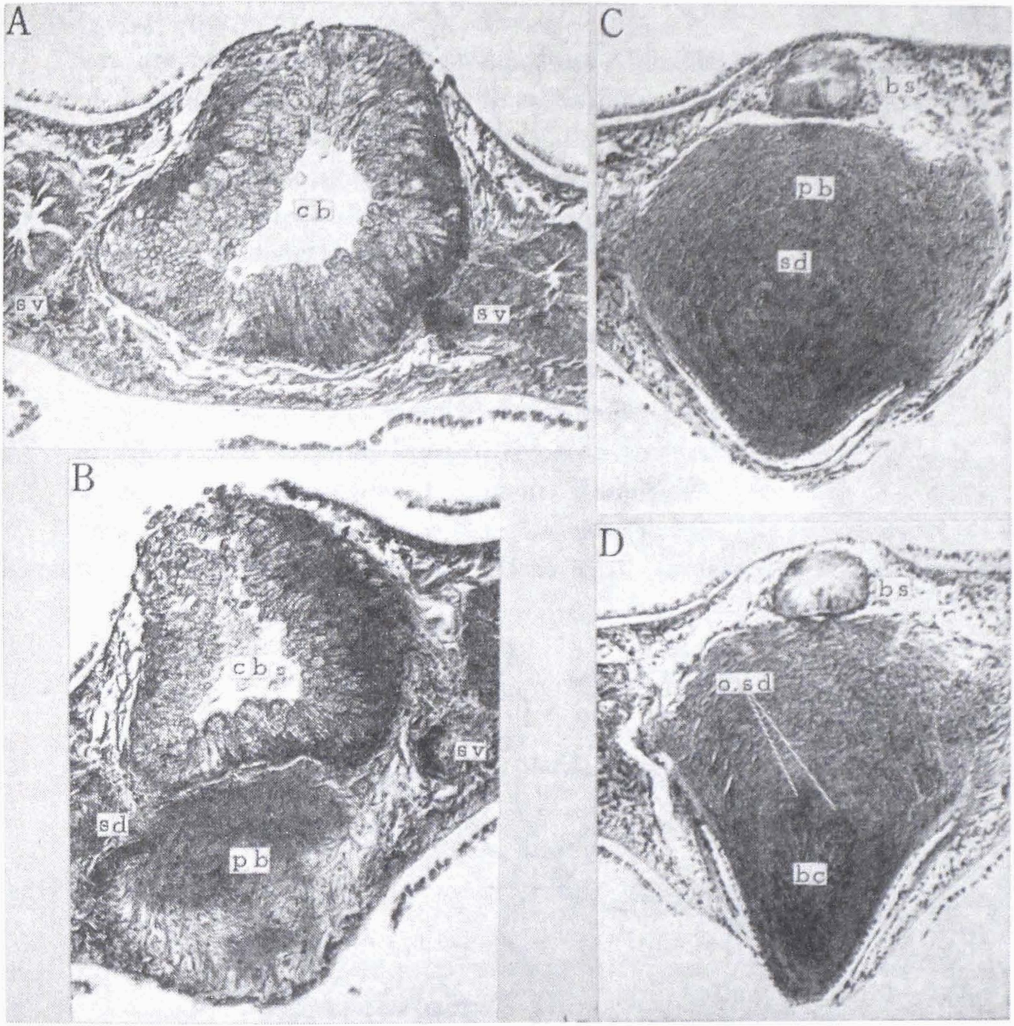

Fig. 6. Cross sections of the copulatory apparatus of the Ishkashim specimen (No. 309 f). A : section showing the copulatory bursa and the spermiducal vesicles. B : section through the penis bulb, at level of entry of the sperm ducts. C : section through the penis, at level of base of penis papilla. D : section showing the openings of sperm ducts in penis papilla.

bc : bulbar cavity ; bs : bursa stalk ; cb : copulatory bursa ; o. sd : openings of sperm ducts ; pb : penis bulb ; sd : sperm duct ; sv : spermiducal vesicle.

Some Water-Mites (Hydrachnellae) from Afghanistan*

By

Taiji IMAMURA**

There are no reports on water-mites from Afghanistan. But Lundblad (1934) reported nine species of water-mites from Kashmir and Indian Tibet, neighbors of Afghanistan, as listed below:

1 *Eylais* (*Meteylais*) *hamata* (Koenike)
2 *Eylais* (*Proteylais*) *degenerata* (Koenike)
3 *Protziella hutchinsoni Lundblad*
4 *Calonyx montanus* Lundblad
5 *Calonyx flagellum flagellum* Lundblad
6 *Parathyas primitiva* Lundblad
7 *Trichothyas* (*Kashmirothyas*) *hutchinsoni* (Lundblad)
8 *Hydrachna* (*Diplohydrachna*) *conjecta* (Koenike)
9 *Atractides* (*Atractides*) *proximalis* (Lundblad)

During the course of the Kyoto University Scientific Expedition to the Karakoram and Hindukush 1960, Dr. Riozo Yosii, Professor of Kyoto University

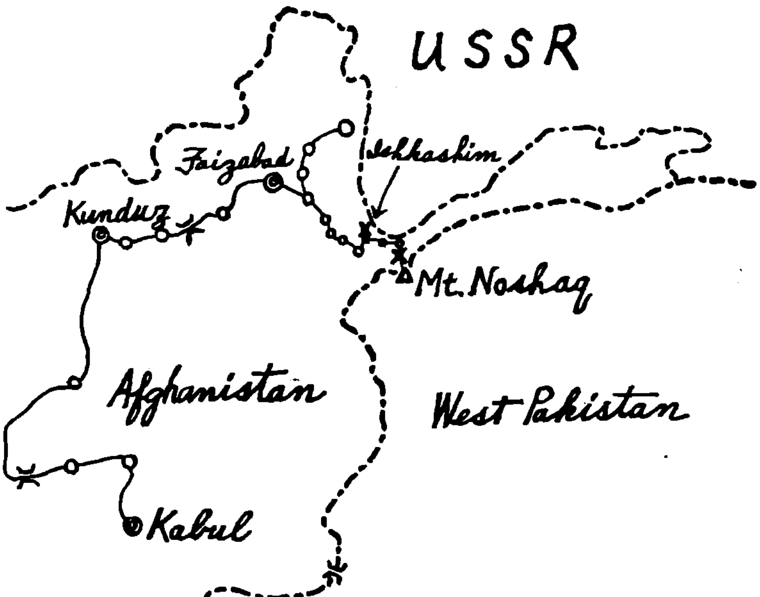

Fig. 1 Map of localities (marked x).

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* Contribution from the Hinuma Hydrobiological Station, Ibaraki University, No. 22.

** Biological Institute, Ibaraki University, Mito, Japan.

and was the sub-leader of the Expedition, collected some water-mites in cold streams of the branches of the River Amu Darya in the Hindukush Mountain Range and he has kindly forwarded and submitted to me the valuable specimens for examination. The localities are as illustrated in Fig. 1 and the specimens, which were put into two vials, have proved as follows. The data on altitudes and water temperatures of the localities are all according to Dr. R. Yosii.

No. 1. A stream in Ishkashim, altitude 1200m, water temp. 13°C; 29. VIII, 1960.

Sperchon (*Sperchon*) *ishkashimensis* n. sp., 2 ♀♀.

No. 2. A stream in Mt. Noshaq, altitude 3800m, water temp., 8°C; 25. VII. 1960.

Calonyx (*Diplocalonyx*) *riozoi* n. subgen. et sp., 12 ♂♂, 16 ♀♀ and 2 Nys.
Protziella hutchinsoni Lundblad 1934, 29 ♂♂, 32 ♀♀ and 4 Nys.
Sperchon (*Sperchon*) *noshaqensis* n. sp., 9 ♂♂ and 6 ♀♀.
Sperchon (*Sperchon*) *yosiii* n. sp., 2 ♀♀.
Lebertia (*Hexalebertia*) *noshaqensis* n. sp., 6 ♂♂ and 9 ♀♀.

Among these, *Protziella hutchinsoni* was first recorded from springs in Indian Tibet. The other species are all new to science. The type-specimens are all preserved in the collection of the Biological Institute, Ibaraki University. The descriptions of them will be given below.

Before proceeding further, I wish to offer my most grateful thanks to the collector, Professor Riozo Yosii, for giving me the opportunity of studying the interesting materials of high altitude in Afghanistan.

Diplocalonyx n. subgen.

The *Calonyx* examined in this time has two slender chitinous plates in each side of the genital area, so the genus *Calonyx* will be divided into the following two subgenera:

Calonyx .... with one genital plate in each side
Diplocalonyx .... with two genital plates in each side

Type-species: *Calonyx* (*Diplocalonyx*) *riozoi* n. sp.

1. **Calonyx (Diplocalonyx) riozoi** n. subgen. et sp.* (Fig. 2)

Female Body almost globular in shape, anterior center protruded conically, but concaved in the middle of each lateral side, measured 1420μ long and 1120μ wide in the widest portion. Skin without chitinous plates and covered with scale-like papillae. Eggs, which were found in the body, round in shape and 192μ in diameters. Eyes double in a capsule, and their interval is 576μ. Maxillar organ 264μ long and 184μ wide. Mandibles stout in shape, 316μ long including

---

* The specific name is dedicated to Prof. Riozo Yosii, collector of the specimens.

a claw and 72μ high in the highest portion. Palps with several spines, not feathered, mainly on the dorsal surface as shown in Fig. 2, c. Palpal segments measured:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	34	112	72	180	46 μ
dorso-ventral height	68	80	84	56	18 μ

The shapes of epimera are as shown in Fig. 2, b. Legs stout and with many claw-shaped spines. Each claw consists of a central tooth of considerable length and a great number of shorter and thinner lateral teeth. The numbers of the lateral teeth:

Tooth number of claws	Inner side	Outer side
Leg I	18	4
II	18	5
III	18	6
IV	18	6

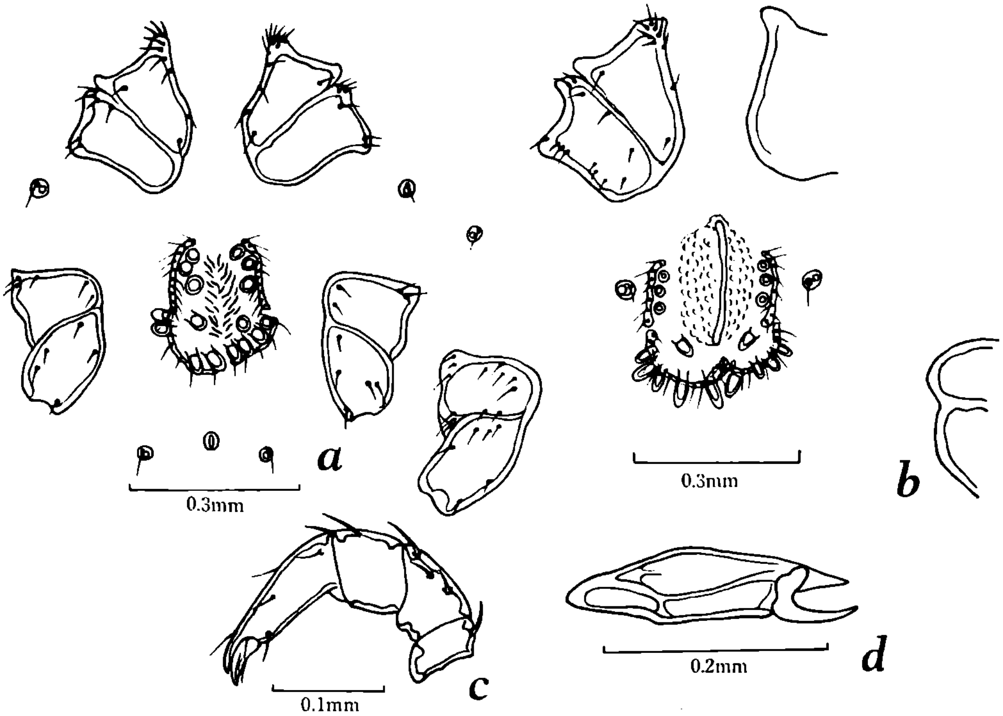

Fig. 2 *Calonyx (Diplocalonyx) riozoi* n. subgen. et sp.:
a epimera and genital area, ♂ ; *b* epimera and genital area, ♀ ; *c* palp, ♂ ; *d* mandible, ♂.

The genital organ with two slender plates and nine genital acetabulae in each side as shown in Fig. 2, b. Genital acetabulae, varied in number in each specimen, grouped into two, the anterior and the posterior, in each side. Slender genital plates, having spines, surround the out sides of each acetabula group. Genital lips covered by scale-shaped papillae. Genital aperture 224μ in length. Genital area 288μ long and 248μ wide.

Male The male resembles the female except in its smaller size and in the genital area. Body 1168μ long and 896μ wide. Interval between eyes 480μ. Maxillar organ 240μ wide. Mandibles 264μ long, including a claw of 68μ long, and 84μ high. Dimensions of palps:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	32	88	64	156	40 μ
dorso-ventral height	64	64	68	48	16 μ

Genital area 256μ long and 220μ wide. Genital aperture 204μ long. Inner surface of the genital lips with many filiform papillae.

Nymph The body and organs are all resemble those of the adults except in the small size and in the lessor numbers of spines on appendages. Body 640μ long and 528μ wide. The number of claw-teeth of L. I are 12 in the inner side and 4 in the outer. Genital acetabulae four in number, two in each side.

Type-locality A stream in Mt. Noshaq, 25. VII. 1960, 12 ♂♂, 16 ♀♀ and 2 Nys.

Type-specimens Holotype, Prep. 1615, ♀; Allotype, Prep. 1573, ♂; Paratypes, all other specimens of males, females and nymphs.

2. **Protziella hutchinsoni** LUNDBLAD 1934 (Fig. 3)

Female Body of ellipse, dorso-ventrally somewhat flattened, 1024μ long and 720μ wide. Skin soft and covered with scale-shaped papillae. Eyes double in a capsule. Interval between eyes is 400μ. Frontal shield in dorsum 215μ long and 230μ wide, and with a frontal organ, located on it rather anterior middle portion as shown in Fig. 3, e. Frontal organ with dotted appearance. Maxillar organ 232μ long and 160μ wide. Mandibles 300μ long, including a claw of 80μ long, and 56μ high. Palps moderately stout as shown in Fig. 3, d. P. II has several spines, some of which are feathered, mainly on the dorsal surface. P. III rhomboidal in side view and with a spine at the dorsal distal end. P. IV longest of all and straight. The dimensions of the segments:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	52	104	54	184	46 μ
dorso-ventral height	68	68	66	36	16 μ

Epimera as shown in Fig. 3, a. Epimeral area 528μ long and 672μ wide. Legs without swimming hairs but with stout spines on them. The dimensions of the leg segments:

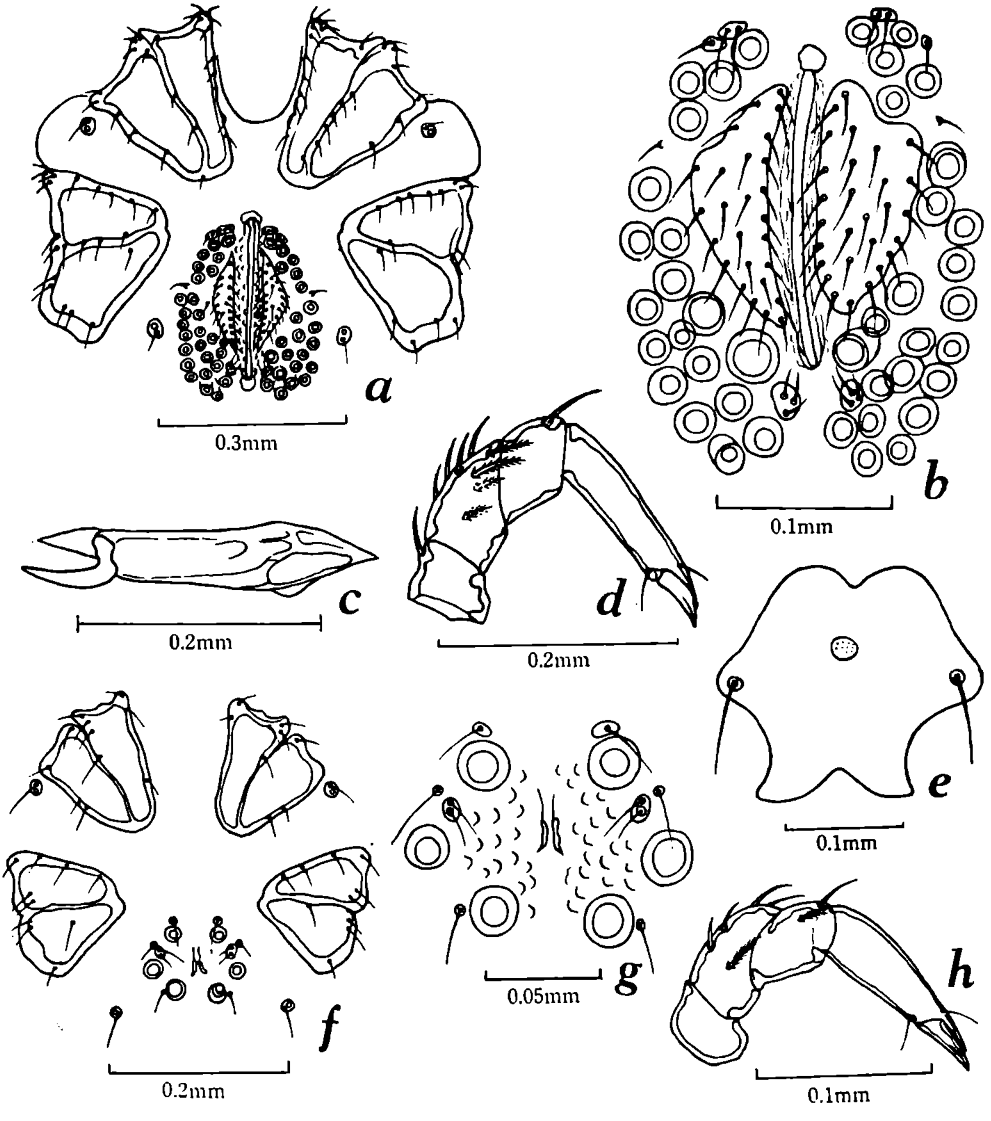

Fig. 3 *Protziella hutchinsoni* Lundblad; *a* epimera and genital field, ♀; *b* genital field, ♂; *c* mandible, ♀; *d* palp, ♀; *e* frontal shield, ♀; *f* epimera and genital field, ny.; *g* genital field, ny.; *h* palp, ny.

Segments		1	2	3	4	5	6
Leg	I	88	88	104	136	152	168 μ
	II	80	112	120	160	192	200 μ
	III	80	112	128	184	208	224 μ
	IV	176	144	152	335	240	248 μ

Claws of legs are all of simple sickle-shape. Genital area as shown in Fig. 3, a, having two plates and three pairs of supplementary plates, of which two pairs at the frontal ends and another pair near the posterior ends of genital area. Genital acetabulae counted 22-26 on each side. Genital plates 120μ long and 36μ wide in each. Genital aperture 240μ long. Excretory pore located at the central portion between the posterior margin of genital area and the posterior body margin.

Male The male is wholly same in the shapes of body and organs, except the genital area, to those of the female. Rather fine ridges present on the surfaces of genital lips, instead of the scale-shaped papillae as in the female.

Nymph Shape of body and organs, except the genital area, mostly resemble those of the adults. Body 625μ long and 410μ wide. Skin soft, with scale-shaped papillae and indicates fine striations. Maxillar organ 164μ long. Mandibles 194μ long and 48μ high. The dimensions of the palpal segments:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	28	64	32	112	32 μ
dorso-ventral height	42	44	40	32	12 μ

Genital area with three pairs of acetabulae and a pair of supplementary plates as shown in Fig. 3, f. Genital area 92μ long and 120μ wide.

Locality A stream in Mt. Noshaq, 25. VIII. 1960; 29 ♂♂, 32 ♀♀ and 4 Nys.

Distribution Indian Tibet, New to Afghanistan.

Remarks The present species was first recorded by Lundblad (1934) from springs (temp. 7.2°C~7.8°C, altitude *ca.* 2819 m-4000 m) in Indian Tibet. The present specimens were collected in a stream at the altitude 3800 m and the water temp. 8°C in Mt. Noshaq. Though the specimens of Mt. Noshaq are somewhat different from those of Indian Tibet in details, for examples: frontal organ with granulated appearance; some spines on P. II are feathered; small supplementary plates present in the genital area of both male and female. But these slight differences seem not enough to build a new species. This species seems to distribute widely in cold waters in high altitutes of Himalaya Mountain Ranges.

3. **Sperchon (Sperchon) ishkashimensis** n. sp. (Fig. 4)

Female Body oval in shape, 1008μ long and 864μ wide. Skin ridged, granulated and covered with rather long scale-like papillae. Interval between eyes 448μ. Maxillar organ 280μ long and 144μ wide, having slender rostrum. Mandibles with very smooth marginal lines, 360μ long including a claw and 64μ high. Palps rather stout. P. II thickest, with a conical protrusion at the ventral terminal end and with several spines on the dorsal surface. P. III longest and with four spines on the dorsal surface. P. IV with two glandular pegs on the ventral surface at the positions of each one third from the distal and proximal ends as shown in Fig. 4, c. The dimensions of the segments:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	32	140	188	160	28 μ
dorso-ventral height	60	120	108	32	16 μ

Epimera as shown in Fig. 4, a. Epimeral area 525μ long and 640μ wide. Legs with no swimming hairs but with spines, rather few in number. Genital plates each 192μ long. Genital aperture 200μ long.

Type-locality A stream in Mt. Ishkashim, 29, VIII. 1960, 2 ♀♀.

Type-specimens Holotype, Prep. 1575, ♀ ; Paratype, Prep. 1576, ♀.

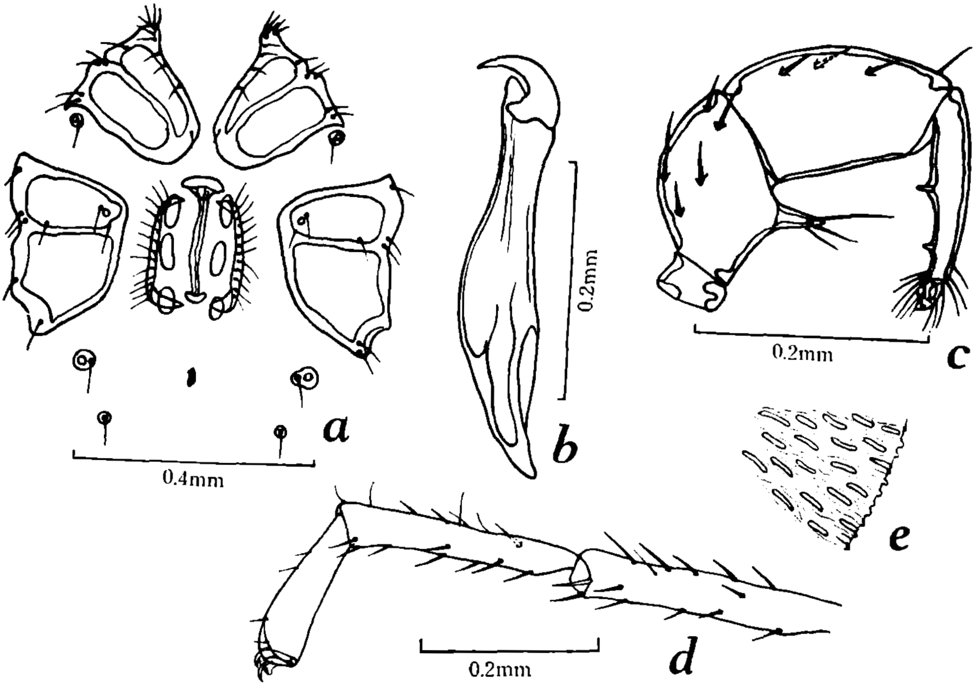

Fig. 4 *Sperchon (Sperchon) ishkashimensis* n. sp., ♀:
a epimera and genital area; *b* mandible; *c* palp; *d* 4th-6th segments of right IVth leg; *e* skin texture, dorsal post-lateral.

Remarks The present new species, though resembles most *Sperchon squamosus* Kramer, different in its skin texture and in the shape of P. III from the known species. The male is not yet collected.

4. **Sperchon (Sperchon) noshaqensis** n. sp. (Fig. 5)

Male Body oval in shape, 1320μ long and 980μ wide. Skin with scale-like papillae and minute ridges as shown in Fig. 5, e. Interval between eyes 480μ. Maxillar organ 304μ long and 200μ wide. Mandibles stout, 480μ long including a claw and 88μ high. Palps as shown in Fig. 5, b. P. II with several spines and curved roundly in the dorsal surface, and with a conical sharp process at the terminal end of ventral surface. P. IV rather short, bent a little near the terminal end and with two glandular pegs on the ventral surface, located moderately apart from each other. The dimensions of the segments:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	24	192	210	180	42 μ
dorso-ventral height	84	120	90	45	24 μ

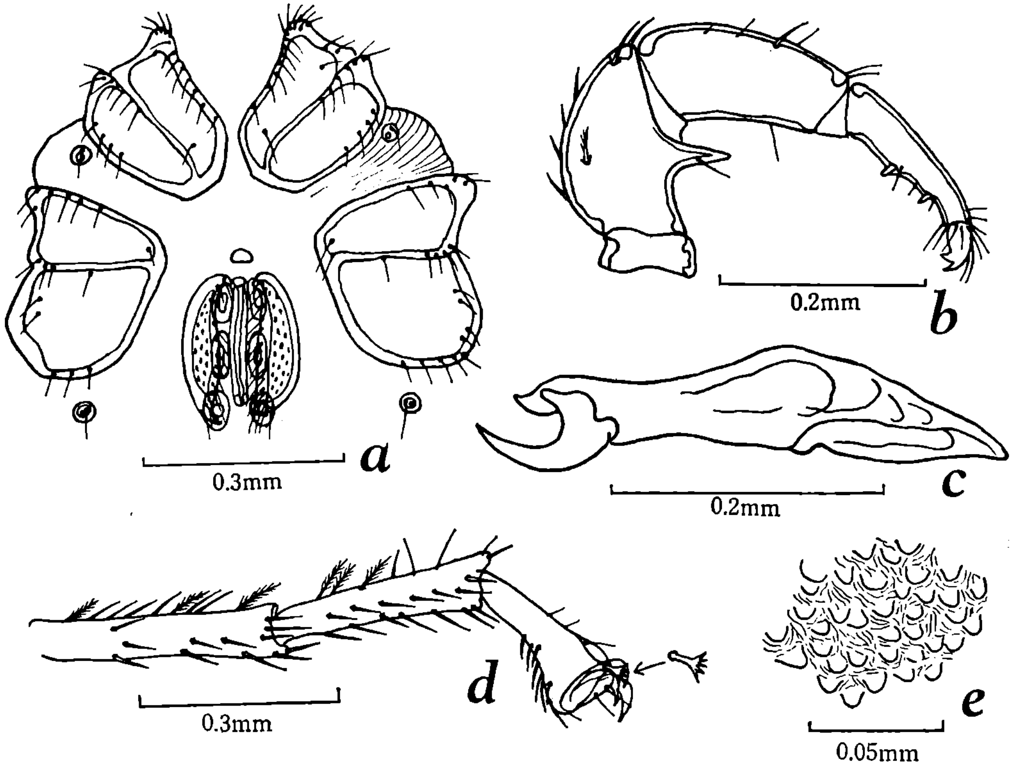

Fig. 5 *Sperchon (Sperchon) noshaqensis* n. sp., ♂ :
a epimera and genital area ; *b* palp ; *c* mandible ; *d* 4th-6th segments of left IVth leg ; *e* skin texture, ventral posterior.

The epimera and the genital organ are as shown in Fig. 5, a. Epimeral area 480μ long and 684μ wide, and located at the anterior one third portion of venter. Legs with spines, some of which are feathered. Distal segment of L. IV is prominently stretched towards its distal portion and with a palmiform spine at the dorsal distal end as shown in Fig. 5, d. Genital plates each 210μ long. Genital aperture 156μ long. Genital acetabulae rather short oval even in the anterior and the middle ones. Excretory pore opens near the posterior body margin in venter.

Female The shapes of body and organs are all almost same as those of the male. Thence there will only be given the measurements as follows. Body 1380μ long and 1000μ wide. Maxillar organ 348μ long. Mandibles 432μ long including a claw and 96μ high. The dimensions of palps:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	30	234	258	204	48 μ
dorso-ventral height	95	148	120	48	24 μ

Epimeral area 540μ long and 720μ wide. Genital aperture 240μ long. Genital plates each 216μ long.

Type-locality A stream in Mt. Noshaq, 25. VII. 1960, 9 ♂♂ and 6 ♀♀.

Type-specimens Holotype, Prep. 1571, ♂; Allotype, Prep. 1614, ♀; Paratypes, all other males and females.

Remarks This species resembles also *Sperchon squamosus* and the previous species, but can be easily distinguished from them by the features of skin texture and the IVth leg's terminal segments which stretched distally and with a characteristic palmiform bristle at the dorsal terminal end.

5. **Sperchon (Sperchon) yosiii** n. sp.* (Fig. 6)

Female Body nearly globular in shape, 1260μ long and 1080μ wide. Skin soft, covered with conical spine-shaped papillae, distributed rather parsely, and with striated appearance. Glandular humps arranged in four rows in dorsum as shown in Fig. 6, a. Interval between eyes 500μ. Mandibles 354μ long, including a claw of 90μ long, and 84μ high. Palps characteristic in shape. P. II very thick, with two conical processes and three claw-shaped spines at the ventral terminal portion and several spines, some of which feathered, on the dorsal surface. P. III thick in its proximal portion and tapered distally. P. IV longest, with two glandular pegs rather near the proximal end and bent a little at the portion of one third distally. The dimensions of the segments:

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* The new species is named in honor of Prof. Riozo Yosii, collector of the specimens.

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	54	174	210	276	54 μ
dorso-ventral height	84	126	108	48	24 μ

The epimera and genital organ are as shown in Fig. 6, b. Epimeral area 592μ long and 850μ wide. Legs with many spines, the longer ones of them all feathered. Genital acetabulae of the anterior and middle pairs are long ellipse, but the posterior ones are rather round. Genital area 274μ long.

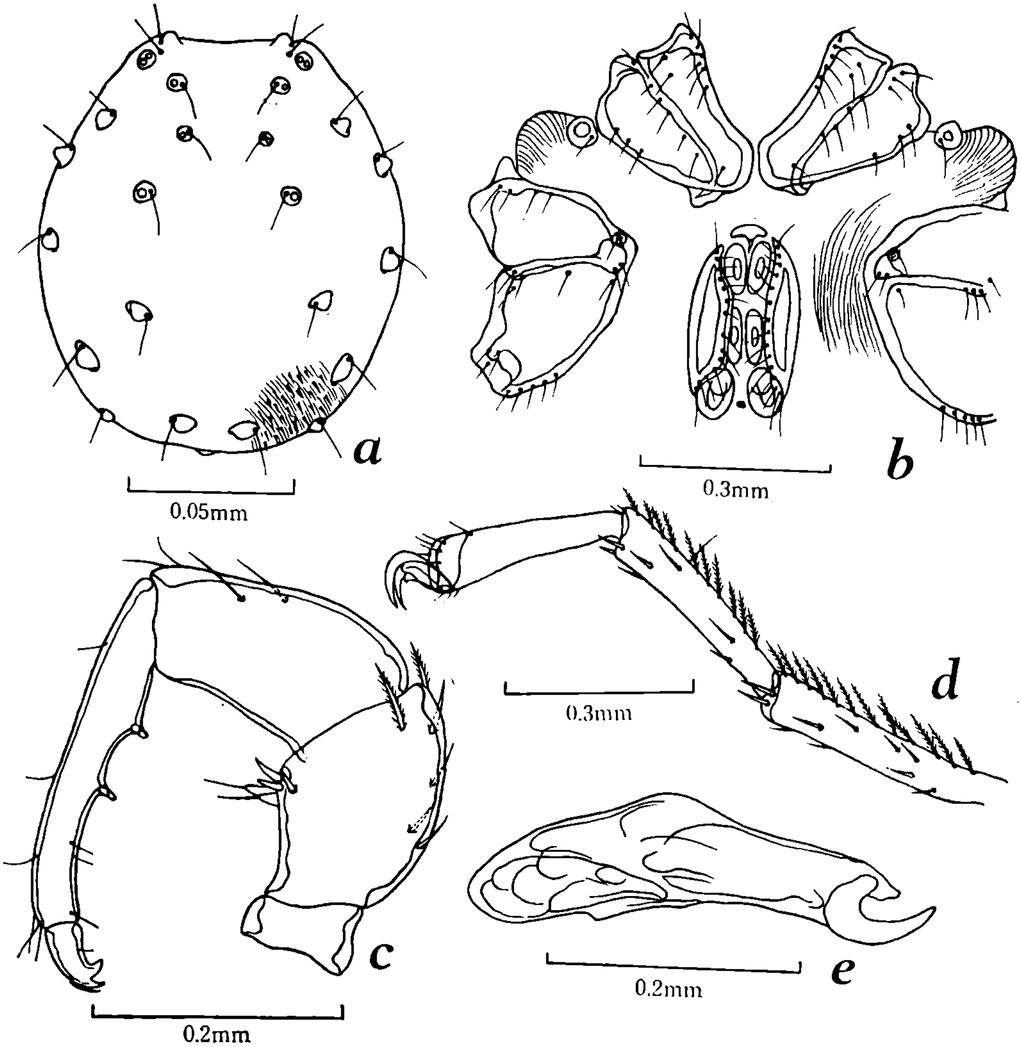

Fig. 6 *Sperchon (Sperchon) yosiii* n. sp., ♀ :
a dorsum; *b* epimera and genital area; *c* right palp; *d* 4th–6th segments of right IVth leg; *e* mandible,

Type-locality A stream in Mt. Noshaq, 25. VII. 1960, 2 ♀♀.

Type-specimens Holotype, Prep. 1608, ♀, and Paratype, Prep. 1609, ♀.

Remarks Though this new species resembles most *Sperchon spinosus* Imamura in Mt. Daisétsu, Hokkaido, it is easily distinguished from the Japanese species by the shapes of skin papillae and the features of the conical process and the bristles on the ventral terminal end of P. II. The male is not yet found.

6. **Lebertia (Hexalebertia) noshaqensis** n. sp. (Fig. 7)

Female Body oval, 1008μ long and 880μ wide. Skin colorless and covered with ridges as illustrated in Fig. 7, d. Maxillar organ 136μ long and 100μ wide. Maxillary bay 176μ deep and 104μ wide. Mandibles 288μ long including a claw and 42μ high. The feature of palps is as shown in Fig. 7, b. P. I with a hair, feathered in its distal portion, at the dorsal distal end. P. II with several hairs on dorsal surface and a hair at the distal end of ventral surface. P. III trapezoidal in side view and with six hairs, four of which on the distal portion and the other two on the dorsal middle portion. Three hairs of these are feathered. The dimensions of the segments:

Palps	P. I	P. II	P. III	P. IV	P. V
dorsal length	36	124	124	124	40 μ
dorso-ventral height	52	80	56	41	20 μ

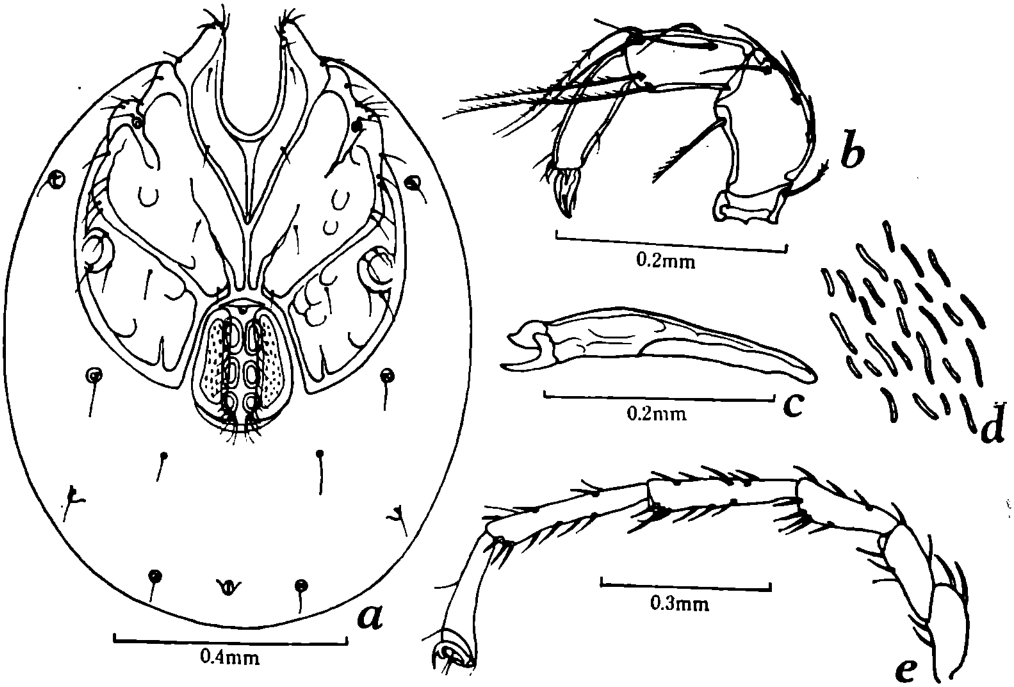

Fig. 7 *Lebertia (Hexalebertia) noshaqensis* n. sp., ♀ :
a venter ; *b* palp ; *c* mandible ; *d* skin texture, dorsal middle ; *e* right IVth leg.

The feature of epimera is as shown in Fig. 7, a. Epimeral area 640μ long and 560μ wide. Legs without swimming hairs but with many spines on them. Genital plates each 192μ long. Genital acetabulae in three pairs, of which anterior ones largest. Excretory pore opens in venter near the posterior body margin.

Type-locality A stream in Mt. Noshaq, 25. VII. 1960, 6 ♂♂ and 9 ♀♀.

Type-specimens Holotype, Prep. 1572, ♀ ; Allotype, Prep. 1622, ♂ ; Paratypes, all other males and females.

Remarks The new species resembles most *Lebertia* (*Septlebertia*) *imamurai* Viets in Hokkaido, but the hairs on P. III are less in number, absent of the outer middle hair, and it is distinguished from the other species of the subgenus *Hexalebertia* by having two ventral distal hairs on P. III as illustrated in Fig. 6, b.

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COCCINELLIDAE of Afghanistan (Insecta-Coleoptera)

By

Hiroyuki KAMIYA

1. **Exochomus flavipes** (THUNBERG)

Specimens examined: 4 exs., Faizabad, Afghanistan, 5. vii. 1960, R. Yosii leg.; 1 ex., Borak, Afghanistan, 10. vii. 1960, R. Yosii leg.

Distribution: Palaearctic Region, Africa, Australia.

This species is newly recorded from Afghanistan in the present paper. For *Ex. flavipes* ab. *nigripennis* recorded by Ahmad, 1947 from Afghanistan is treated as a different species *Ex. nigripennis* (Erichson) (Bielawski, 1956, 1959).

2. **Adonia variegata** (GOEZE)

Specimens examined: 1 ex., Istalif, Afghanistan, 26. vi. 1960, R. Yosii leg.; 1 ex., Faizabad, Afghanistan, 8. vii. 1960, R. Yosii leg.; 1 ex., Borak, Afghanistan, 11. vii. 1960, R. Yosii leg.; 2 exs., Ishkashim, Afghanistan, 25. viii. 1960, R. Yosii leg.; 6 exs., Taiwara, Afghanistan, 3. ix. 1955, T. Umesao leg.

Distribution: Palaearctic Region, India, Africa.

3. **Coccinella septempunctata** LINNAEUS

Specimens examined: 8 exs., Kishim, Afghanistan, 5. vii. 1965, R. Yosii leg.; 1 ex., Faizabad, Afghanistan, 6. vii. 1960, R. Yosii leg.; 4 exs., Borak, Afghanistan, 9-10. vii. 1960, R. Yosii leg.; 1 ex., Tilgran, Afghanistan, 13. vii. 1960, R. Yosii leg.; 2 exs., Mt. Noshaq (3940 m), Afghanistan, 13. vii, 1960, R. Yosii leg.; 2 exs., same locality, 31. vii. 1960, R. Yosii leg.; 2 exs., Mt. Noshaq (4800 m), floating on the surface of a pond on a glacier, R. Yosii leg.; 2 exs., Mt. Noshaq (5000 m), 13. viii. 1960, R. Yosii leg.; 1 ex., Mt. Noshaq (5200 m), 20. viii. 1960, R. Yosii leg.; 1 ex., Ishkashim, Afghanistan, 25. viii. 1960, R. Yosii leg.

Distribution: Palaearctic Region, India.

4. **Coccidula rufa** (HERBST)

Specimen examined: 1 ex., Borak, Afghanistan, 12. vii. 1960, R. Yosii leg.

Distribution: Europe, Siberia, China.

This is the first record from Afghanistan of the present species which is closely related to *Coccidula unicolor* Reitter from Caucasus, Transcaspia, Iran, Turkestan, but easily distinguishable from it in the ventral coloration, etc.

Plecoptera from the Hindukush

By

Teizi Kawai[*]

The present article is based upon the stonefly collection made by Dr. Riozo Yosii during the Kyoto University Pamir-Hindukush Expedition 1960. It consists of 16 imagines and 76 nymphs, belonging to 9 species, and two of them seem to be new to science. They fall into seven genera belonging to four families. Concerning some nymphs and an imago whose specific identification remains in question, I will give the descriptions and illustrations of them as well in detail as possible. All the type specimens are preserved in my Plecoptera collection.

My sincere thanks are due to Dr. Riozo Yosii, Kyoto University, who placed the interesting materials at my disposal for study. I am also indebted to Dr. Masuzo Uéno, Prof. emeritus of the Kyoto University, who gave me various facilities for this study. Thanks are also due to Dr. D. E. Kimmins, British Museum (Natural History) for valuable suggestion to this study.

Nemouridae

Nemoura sp. (sp. No. 102), Nymphs

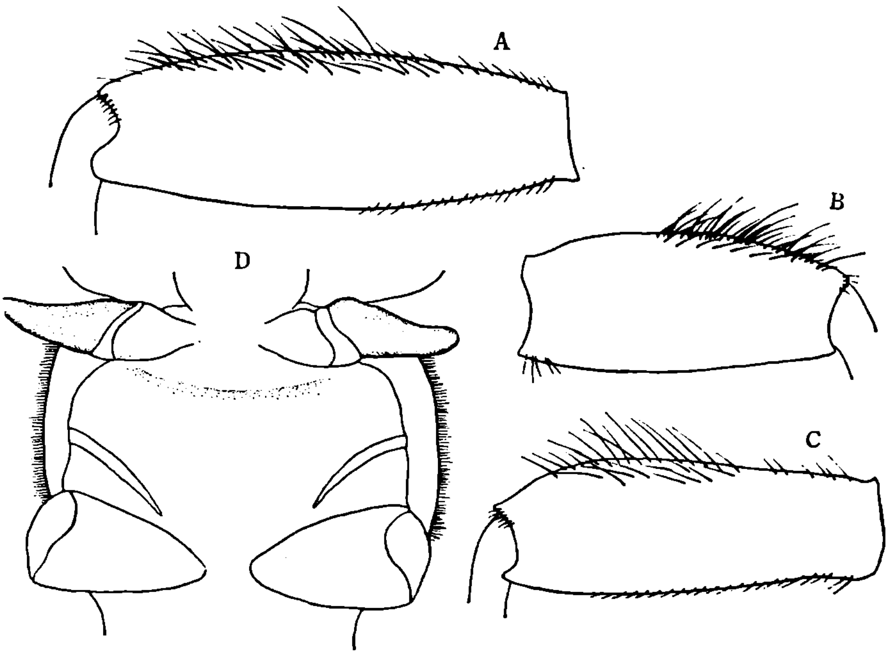

Fig. 1. *Nemoura* sp. (sp. No. 102) A. Hind femur; B. Fore femur; C. Mid femur; D. Cervical part, showing the two gill-like knobs.

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16 specimens of indistinguishable sexes, because all of them are smaller than 5 mm in body length. The morphological features of them are acord with the specimens which have already been described from Gilgit in Karakoram (KAWAI, 1963). They are characterized in having a pair of remarkable whitish large gill-like membraneous knobs on both sides of the prosternal region. They are directed laterally and are nearly one and half times as long as their bases, but those of the specimens smaller than 3 mm are nearly as long as their bases.

The imago is unknown. Nemourid nymph with such gill-like knobs on the prosternal region as in the present specimens have not been known. With respect to the cervical features, it is very questionable that this nymph is placed under the genus *Nemoura*. It seems to me that the present species should be placed under any other new genus or new subgenus to be established.

Locality: 16 nymphs, a limnocrene on Mt. Noshaq (ca. 3,800 m a. s. l.), 29-VII-1960, R. Yosii leg.

Amphinemura sp. (sp. No. 302), Nymphs

3 specimens of smaller than 5 mm in body length, sexes indistinguishable.

Body length 4 mm. General colour yellowish brown, but abdominal segments a little darker than other parts.

Head rounded, nearly as wide as pronotum, hind margin rounded; epicranial suture and dorsal callosities indistinct; epistomal suture concave at middle. Ocelli indistinct, but posterior two very small, barely visible, anterior one invisible for it is the same colour to the surroundings. Antenna long, nearly half as long as body, 2 mm, pale yellowish brown. Compound eyes moderate in size, black, situated on lateral side of head. A pale brown band in the line of anterior margin of both compound eyes; a small pale brown marking present between posterior two ocelli.

The mouth parts do not differ from those of the genus described previously (KAWAI, 1963).

Pronotum quadrate, wider than long, a little narrowed posteriorly, all angles rounded, frontal margin a little convex, hind margin nearly straight; lateral margins somewhat rounded; dorsum arched, without markings; both lateral and frontal margins with a well developed fringe of bristles of subequal length, that of lateral margins entirely longer than that of frontal margin; hind margin and middle part of frontal margin without a fringe of bristles. Two pairs of stalked bunches of filamentous white gills present on each antero-lateral side of prosternum; a pair of outer bunches arises on outer side of cervical sclerite, a pair of inner one just posterior to this outer one; gill on both outer and inner bunches consist of 5-7 filaments.

Meso- and metanotum somewhat arched dorsally, the former with a group of yellowish brown stout bristles antero-laterally and the latter with a few of bris-

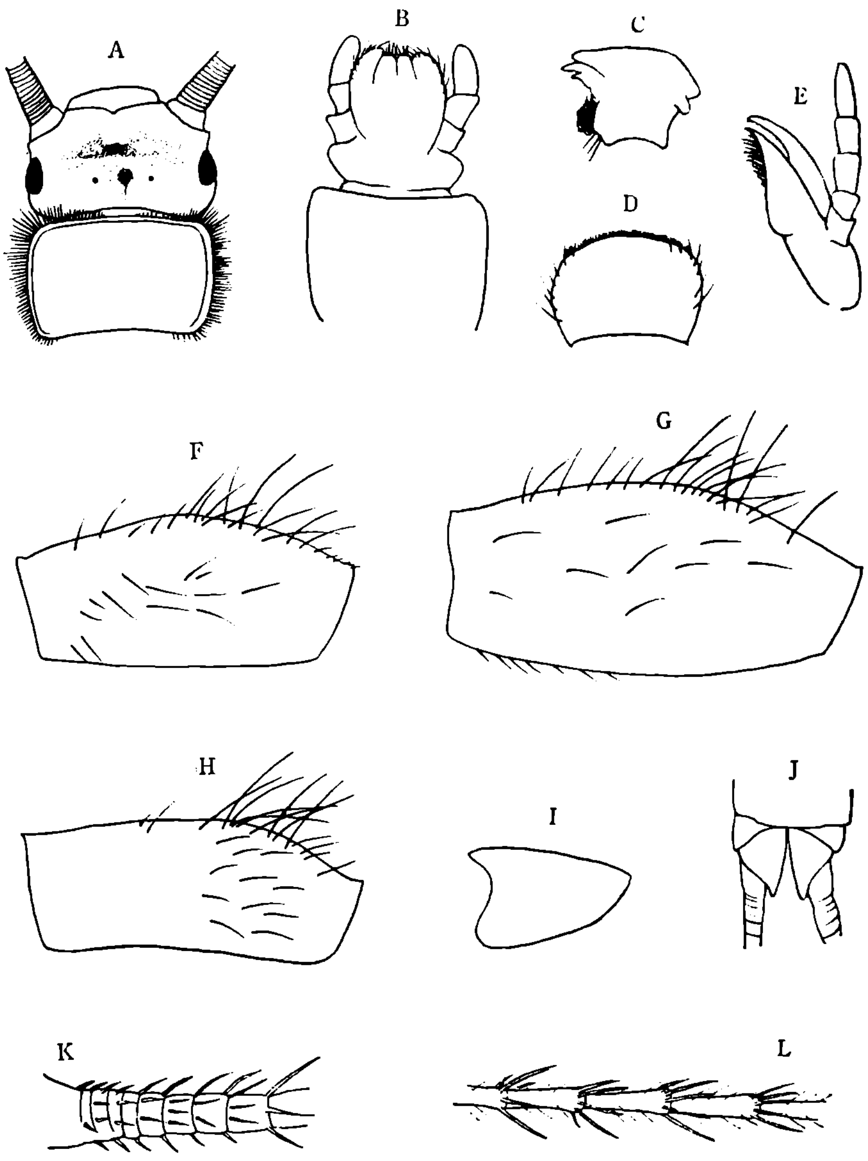

Fig. 2. *Amphinemura* sp. (sp. No. 302) A. Head and prothorax ; B. Labium ; C. Mandible ; D. Labrum ; E. Maxilla ; F. Fore femur ; G. Hind femur ; H. Mid femur ; I. Subanal lobe, lateral view ; J. Last abdominal segments, ventral view ; K. Cercus, proximal parts ; L. The same, distal parts.

tles. Wing-pads not developed.

Legs stout and covered with bristles, femur of each leg with a row of long stout bristles on dorsal side ; scattered relatively stout short bristles on anterior side, region of which is the widest in hind femur and the narrowest in mid femur ; distal margin of each femur with many minute bristles of rounded tip ; tibia with a group of small stout bristles and a fringe of hairs on dorso-posterior side. Third tarsal segment of each leg longer than first and second segments combined together; claw large and strong.

Abdomen cylindrical, brown, ventral side paler than dorsal side. From first to sixth abdominal segments completely divided into tergum and sternum, the followings not divided. Each tergum covered with fine white hairs. Ninth sternum a little drawn out backwards into a subgenital plate; subanal lobe triangular, directed backwards with a pointed tip.

Cercus nearly two-thirds as long as body, 3 mm, yellow, a several basal joints cylindrical, succeedings become longer and slenderer; distal end of each joint wider than its proximal base, and with an apical whorl of sharp pointed bristles which do not change in length.

Locality: 3 nymphs, Doab, 10-IX-1960, R. Yosii leg.

Remarks: These nymphs are closely related to *Amphinemura* sp. (sp. No. 301) (KAWAI, 1963, p. 72, figs. 11-12) in general features. They can, however, be distinguished from the latter by the pronotal fringe of bristles, head markings and the frontal fringe of bristles on each leg.

Capniidae

Capnia noshaqensis sp. nov.

Female: Body elongate, reddish brown. Head small, rounded and without markings, wider than frontal margin of pronotum, the widest across compound eyes; with three ocelli, the distance between posterior two nearly one and half times as far as between posterior one and inner margin of compound eye; dorsal callosities situated on lateral side of compound eye, triangular and brown; epicranial suture indistinct except basal arm. Antenna nearly as long as body, 8.3 mm, composed of 50 joints, yellowish brown, moniliform.

Pronotum quadrangular, reddish brown, without markings, a little longer than wide, fore angles somewhat rounded, posterior ones not rounded, lateral margins somewhat rounded, hind margin wider than frontal margin. Meso- and metanotum heavily sclerotized, brown. The sternal structures not differ from those of the other species of the genus *Capnia*. Venation typical to that of the genus *Capnia*. Legs rather long and slender, brown, each femur shorter than tibia; second tarsal segment the shortest, third longer than first and second combined together. Tarsal claw brown, strongly sclerotized, sharply pointed.

Abdomen cylindrical, each segment, except last segment, completely divided into tergum and sternum. Hind margin of last tergum extends backwards with rounded triangular margin. All terga not divided into two sclerites, without a membraneous area between them. Seventh sternum a little produced backwards with triangular hind margin. Eighth sternum semi-sclerotized but hind margin heavily sclerotized. Base of eighth sternum linked to seventh sternum by a large area of intersegmental membrane and eversible. Subgenital plate very small,

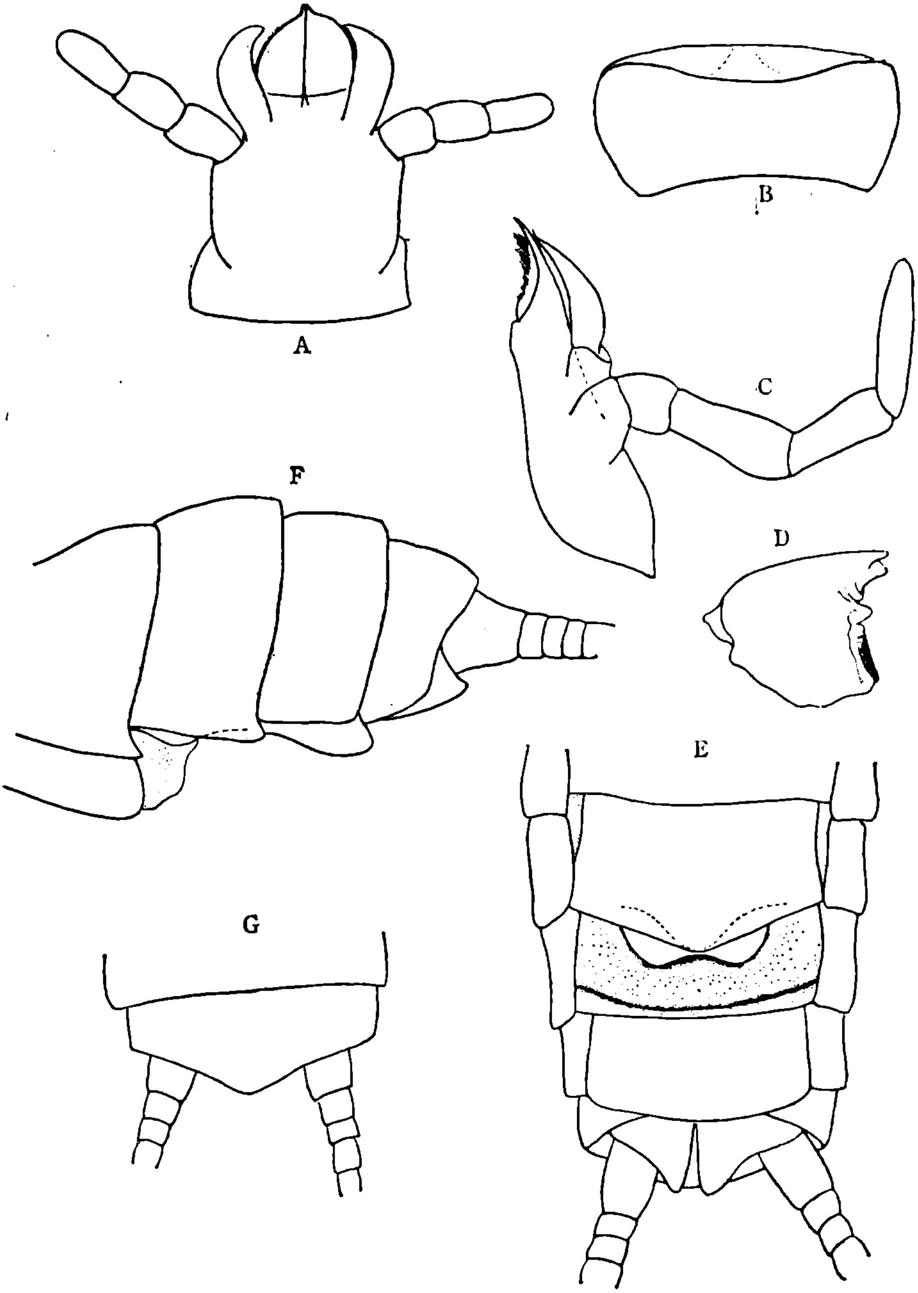

Fig. 3. *Capnia noshaqensis* sp. nov. A. Labium; B. Labrum; C. Maxilla; D. Mandible; E. Last abdominal segements of female, ventral view; F. The same, lateral view; G. The same, dorsal view.

oblong, with a rounded notch at middle of hind margin, nearly two-thirds as wide as eighth sternum and extending backwards but not over half length of eighth sternum. Subanal lobe triangular, extending backwards and obliquely upwards, with bluntly pointed margin.

Cercus nearly as long as body, 7 mm, composed of 24 joints; a few basal joints moniliform, the succeeding joints gradually become longer and slenderer towards apex; distal end of each joint with pointed silver white hairs which are nearly same length in distal joint.

Antenna, body and legs covered with fine brown hairs.

Body length 8.5 mm, fore-wing 10 mm, hind-wing 9 mm.

Holotype: 1 ♀, Mt. Noshaq (ca. 5,200 m a. s. l.), 12-VII-1960, R. Yosii leg.

Paratype: 11 ♀♀, the same locality to the holotype; 4 ♀, a pond on the glacier of Mt. Noshaq (ca. 4,800 m a. s. l.), 17-VII-1960, 13-VIII-1960, R. Yosii leg.

Remarks: No species with very small subgenital plate and large eversible intersegmental membrane between the seventh and the eighth sterna as in the present new species has been known. In general features, however, this new species is closely related to *Capnia sparre-schneideri* Esben-Petersen which was described from the Jenisei River but can easily be separated from the latter by the marking on the head and pronotum as well as the size and the shape of the subgenital plate.

Capnia manii JEWETT

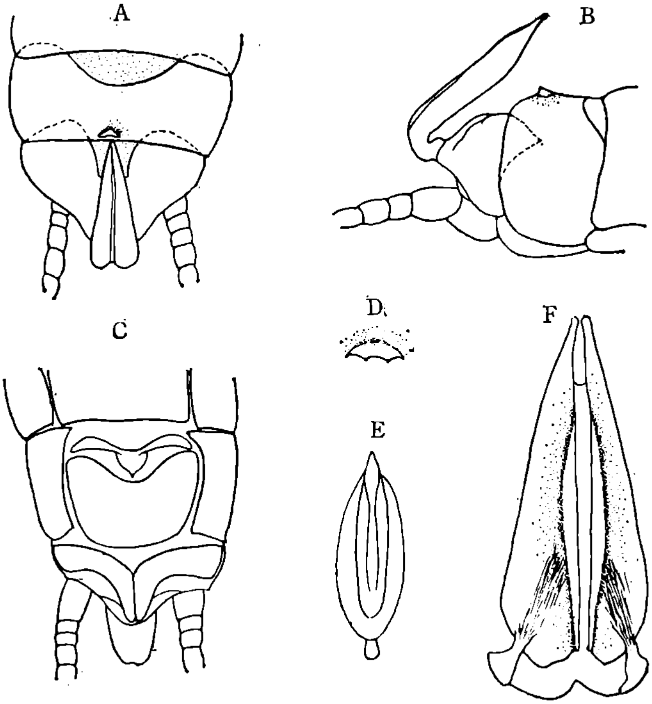

Fig. 4. *Capnia manii* Jewett A. Last abdominal segments of male, dorsal view; B. The same, lateral view; C. The same, ventral view; D. A knob on the ninth tergal hind margin; E. Fusion plate; F. Supra-anal process.

This species was originally based upon the both sexes from the Beas River Valley, near Marhi, in the Punjab Himalaya. The specific characters of the present materials do not differ from the original description except the colouration of the fore-wings. In the present materials from the Hindukush the fore-wings are entirely hyaline, while those of the type specimens from the Punjab Himalaya are partially smoked. The hind-wings from both localities are entirely hyaline.

The fusion plate of this species is narrow, about five times as long as wide, gradually narrowed hind margin, which extends a little beyond the tip of subanal lobes. Basal margin connected by membrane with a small rectangular sclerotized retractoral plate. The supra-anal process is moderate in size and heavily sclerotized, with a groove at middle on dorsal side throughout.

Each tergum of the first to eighth segments is divided into two sclerites, membraneous between them and with a brown marking. Hind margin of ninth tergum provided with a small brown knob at middle.

Locality: 1 ♂, Mt. Noshaq (ca. 3,800 m a. s. l.), 25-VII-1960, R. Yosii leg.

Allocapniella pedestris (KIMMINS)

This species was originally described by KIMMINS (1946) as *Capnia pedestris* from the Rongbuk Glacier, Mt. Everest. Its females and nymphs collected from Gitidas, Himalaya were described by AUBERT (1959), and the nymphs have been reported also by KAWAI (1963) from Talis, Kashmir, and Phokar Valley, Punjab Himalaya. I have had a doubt on the mesosternal structures of this species. Having examined it again, I have come a conclusion that any genus should be erected for this species other than the genus *Capnia*.

Precoxal bridge completely fused with prothoracic basisternum; prothoracic furcasternum separated from the posterior margin of prothoracic basisternum; spinasternum long, but shorter and slenderer than that of both *Capnia* and *Takagripopteryx*, completely separated at its lateral angles from mesothoracic basisternum, between them widely separated rather than that of *Takagripopteryx*; mesothoracic basisternum, combined with metathoracic furcasternum, fun-shaped, both of its lateral sides separated from katepisternum, sterna-costal suture distinct. Mesopleuron very simplified. The stubs of rudimentary wings or processes like wing-pads as in *Eocapnia* entirely absent. All these structures described above agree with those of *Allocapniella*, not those of *Capnia*. It seems to me to place this species under the genus *Allocapniella* rather than to place it in the genus *Capnia* by the structures of mesosternum. Through the kindness of Dr. D. E. KIMMINS, I could know the mesoternal structure of the type specimens which do not differ from those of *Allocapniella*.

The pair of processes on the hind margin of the ninth tergum in the specimens from Mt. Noshaq is longer and more pointed than those from Mt. Everest.

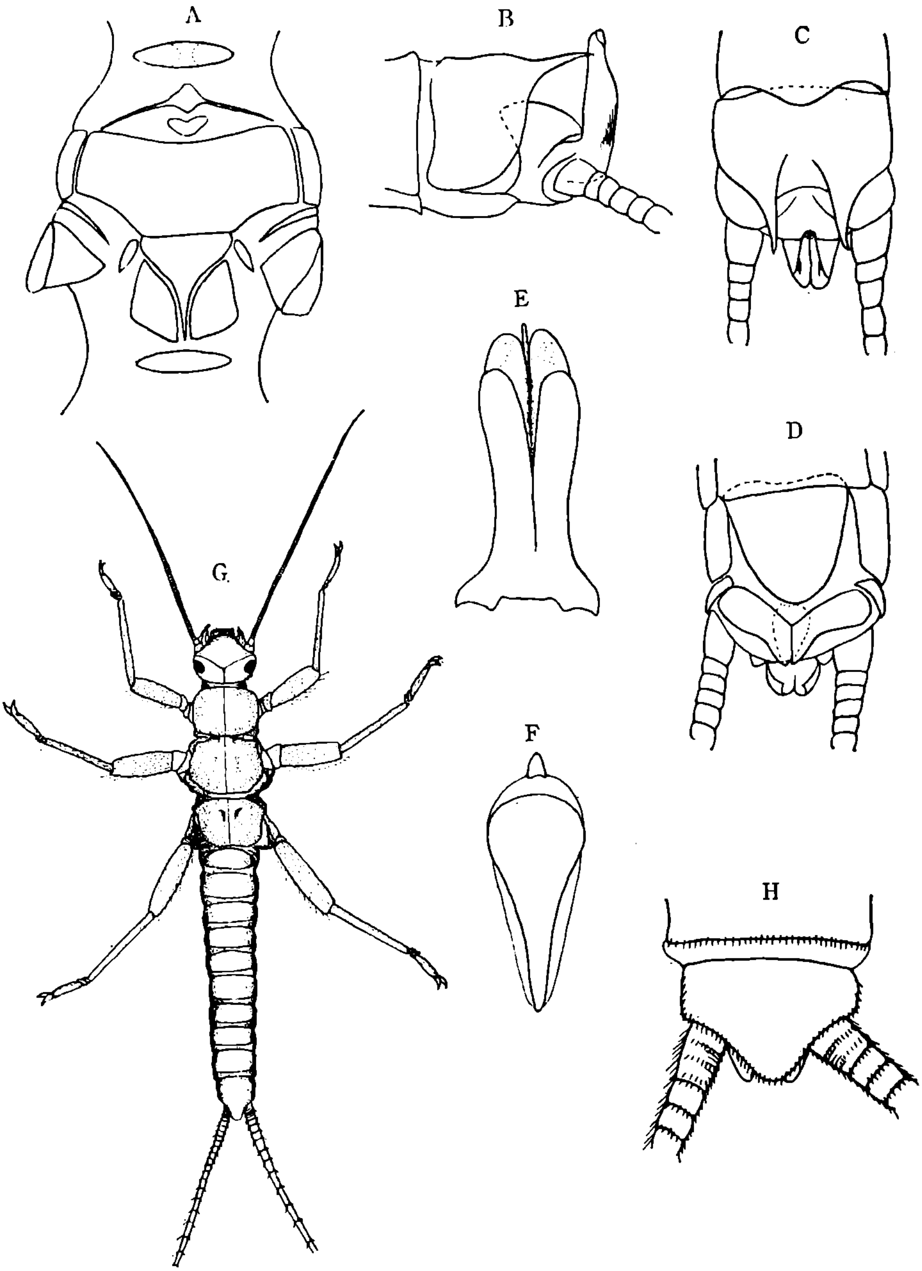

Fig. 5. *Allocapniella pedestris* (KIMMINS) A. Mesosternum; B. Last abdominal segments of male, lateral view; C. The same, dorsal view; D. The same, ventral view; E. Supra-anal process; F. Fusion plate; G. Nymphal male; H. Last abdominal segments of nymphal male, dorsal view.

and this feature resembles closely those from Gitidas. The supra-anal process not so large, directed upwards, sclerotized, apical part membraneous, with a minute membraneous process; ventral surface extending a little beyond the apex of dorsal side which is grooved at middle. The fusion plate spoon-shaped, longer than wide, the widest at near basal margin and gradually narrowed at hind margin which does not extend beyond the subanal lobes. It is connected anteriorly by membrane with a small triangular retractoral plate.

The description of the nymph of *Allocapniella pedestris* was already done by AUBERT (1959) and KAWAI (1963). The present specimens do not differ from the previous descriptions.

Locality: 1 ♂, a pond on the glacier at 4,800 m a. s. l., Mt. Noshaq, 13-VIII-1960; 1 ♂, Mt. Noshaq (ca. 5,200 m a. s. l.), 12-VIII-1960; 1 ♂, Mt. Noshaq, 17-VIII-1960; 34 nymphs, Mt. Noshaq (ca. 3,400 m a. s. l.), 20-VII-1960; 2 nymphs, Mt. Noshaq, 1-VIII-1960; 1 nymph, Mt. Noshaq (ca. 3,800 m a. s. l.), 25-VII-1960, R. Yosii leg.

Perlodidae

Perlodes (Skobeleva) sp., Nymphs

19 nymphs, body length of the largest specimen 19.5 mm, cerci 8.5 mm, and

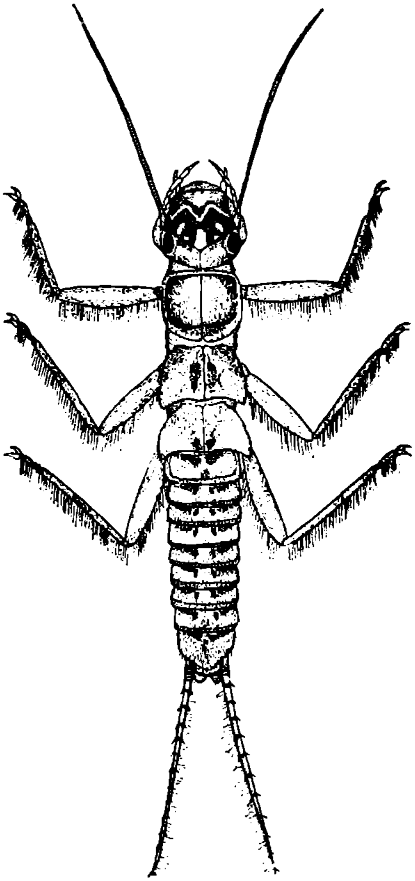

Fig. 6. Nymph of *Perlodes (Skobeleva)* sp.

the smallest 7.5 mm long, cerci 3 mm.

The colouration and the morphological details of the body agree with the specimens from the Punjab Himalaya (KAWAI, 1963).

Locality: 5 nymphs, a stream near Shewa Lake, 9-IX-1960; 8 nymphs, Ishkoshim, 29-VIII-1960; 6 nymphs, Doab, 10-IX-1960, R. Yosii leg.

Isoperla sp.

Female: General colour milky yellow with pale brown markings on head and thorax; body length 12.8 mm. Head milky yellow with tow triangular pale markings near both lateral margins of occipital part, and also a pale brown marking near frontal margin. Antenna milky yellow, but distal joints somewhat pale brown. Pronotum with a milky yellow median longitudinal stripe, much narrower at middle than at frontal and hind margins; each side of stripe pale brown with many irregular brown markings. Meso- and metanotum milky yellow. Abdomen milky yellow without coloured markings. Ventral side of body milky white. Femur of each leg milky yellow, without marking, each tibia and tarsus as well as claws pale brown.

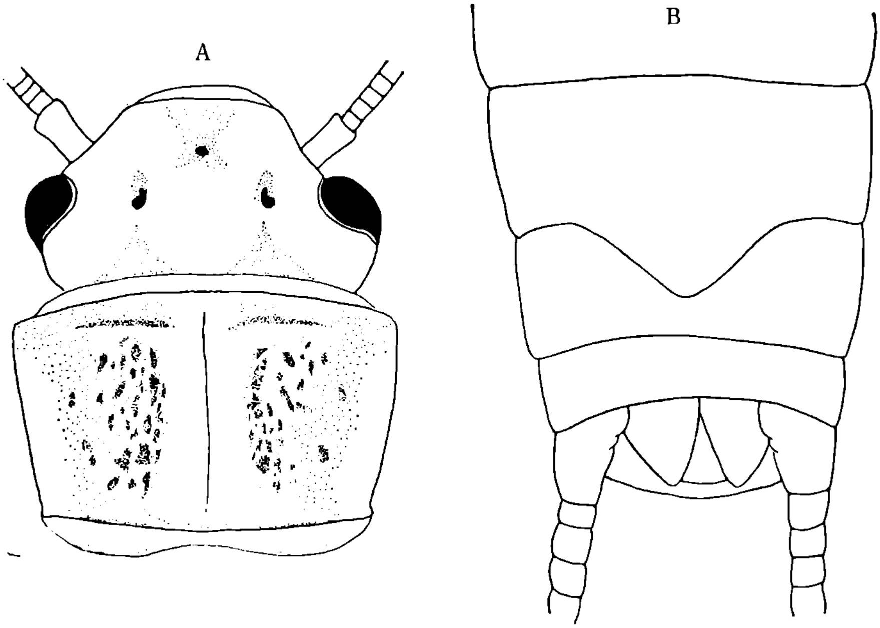

Fig. 7. *Isoperla* sp. A. Head and prothorax; B. Last abdominal segments of female, ventral view.

Head rounded triangular, narrower than pronotum; with three black ocelli, posterior two situated in a line at middle of inner margins of compound eyes; the distance between them nearly two and half times as far as between posterior one and inner margin of compound eye; dorsal callosities indistinct; antenna long and slender, nearly two-thirds as long as body.

Pronotum quadrate, slightly wider than long, all angles not rounded, frontal margin somewhat rounded and a little wider than hind margin which is straight; dorsum somewhat rugose. Wings hyaline; veins sepia brown except colourless Sc and anal veins of both wings; venation typical to that of the genus. Legs long and slender, femur of each leg shorter than each tibia; ratio of three segments of tarsus, 2 : 1 : 4.

Abdomen cylindrical, last tergum with rounded hind margin; subanal lobe small and triangular; eighth sternum produced into a triangular subgenital plate which extends to middle of ninth sternum.

Cerci long and slender, nearly half as long as body, 5.5 mm.

Locality: 1 ♀, Pagman, 17-VII-1960, R. Yosii.

Remarks: The specimen examined is closely related to the North American, *Isoperla dicala* Frison in the general features, but is easily separated from the latter by the head marking and shape of the subgenital plate.

None of isoperlid species, both imagines and nymphs, was recorded from the Central Asia.

Isoperla sp., Nymph

One nymph, body length 9 mm. General colour yellowish brown, with pale

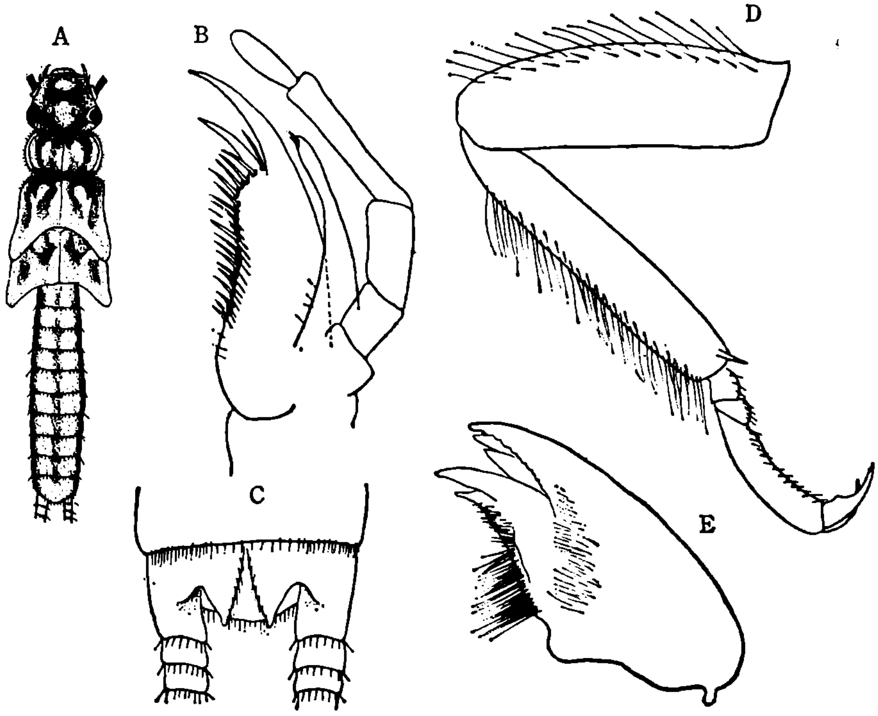

Fig. 8. *Isoperla* sp. A. Dorsal view; B. Maxilla; C. Last abdominal segments, ventral view; D. Mid leg; E. Mandible.

brown or yellowish markings on dorsal side of body, ventral side uniformly pale brown.

Head large and wide, somewhat flattened, nearly as wide as pronotum, M-line and dorsal callosities indistinct. A large rhomboidal yellowish marking situated before frontal ocellus, a yellowish area present between hind two ocelli. Hind two, kidney-shaped and larger than rounded frontal one ; the distance between hind two nearly as far as between one of them and inner margin of compound eye. Compound eyes small and black. Antenna long and slender, yellow, somewhat filiform, nearly one third as long as body, 3.4 mm.

Mouth parts are typical to those of isoperlid. Maxilla well developed, yellowish brown, lacinia long and relatively broad, pointed at tip with a large and a small strong tooth on inner side near tip, followed with a fringe of stout bristles arranged in double rows ; galea shorter than lacinia, without hairs on inner margin, with a few sharp pointed setae at tip. Mandible well developed, large and strong, sclerotized, with two rows of a few unequal teeth on masticatory surface, followed by two rows of comb of stout hairs.

Pronotum subquadrate, wider than long, all angles rounded, general colour yellowish brown, with two pale brown stripes on both sides of middle line ; pronotal margin with small brown bristles. Meso- and metanotum with a paired pale brown markings ; wing-pads developed, nearly parallel to the body. Legs rather long and slender, yellowish, covered with brown hairs and fringed with fine white hairs on dorsal side and with a row of brown bristles along the dorsal margin of femur and tibia.

Abdomen a little tapering anteriorly, yellowish brown, with three pale brown stripes on dorsal side. First two terga completely separated from sterna, remainings not separated. First sternum small and completely fused with basisternum of metathorax. Each tergum has a fringe of brown bristles on its hind margin. Subanal lobe heavily sclerotized, triangular, longer than wide at base, with pointed tip and with a row of brown bristles along inner margin.

Cerci yellow, nearly as long as body, 5 mm. Each joint has an apical whorl of sepia brown bristles on distal end.

Locality: 1 nymph, Borak, 10-VII-1960, R. Yosii.

Chloroperlidae

Alloperla pagmanensis sp. nov.

Female: General colour milky yellow, with pale brown markings. Body length 8mm.

Head milky yellow, without markings. Pronotum uniformly milky yellow, both lateral margins pale brown. Meso-and metanotum concolourous ; each hind margin with a remarkable sepia brown U-marking. All segments of each leg milky yellow, without coloured markings. Dorsum of abdomen with a sepia brown

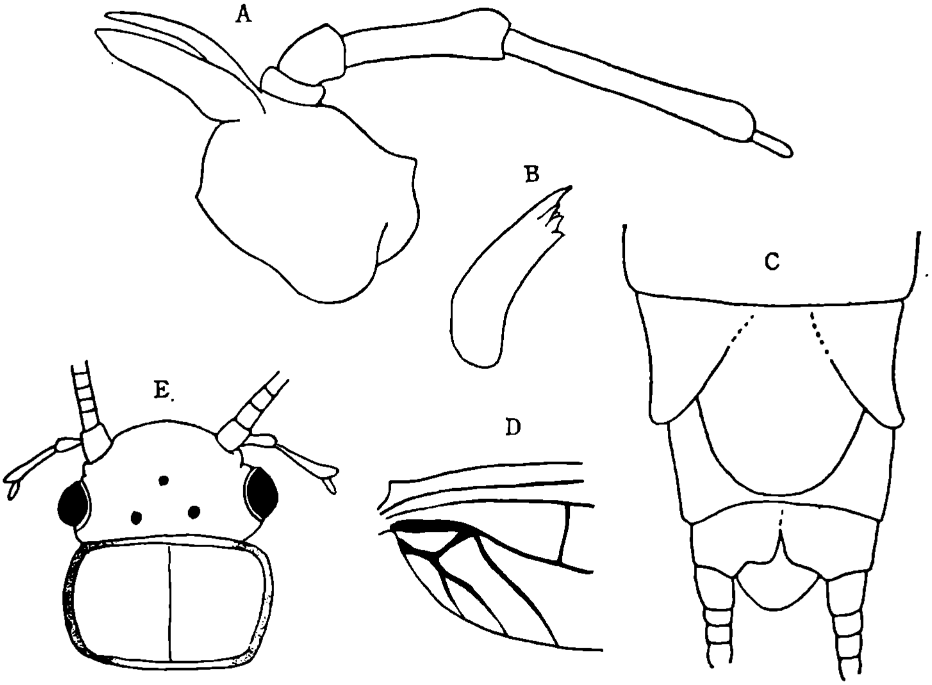

Fig. 9. *Alloperla pagmanensis* sp. nov. A. Maxilla ; B. Mandible ; C. Last abdominal segments of female, ventral view ; D. Basal part of forewing ; E. Head and prothorax.

median longitudinal stripe extending backwards from basal segment over first eight terga.

Head rounded, a little wider than pronotum, with large black compound eyes and conspicuously three ocelli arranged nearly equilateral triangular ; the distance between posterior two nearly as far as between posterior one and inner margin of compound eye ; anterior one situated in the line of anterior margin of compound eyes. Antenna long and slender, but its tip broken off. M-line and dorsal callosities indistinct.

Pronotum quadrate, wider than long, all angles rounded. Wings hyaline ; venation typical to the genus.

Abdomen cylindrical, without special structures. Subgenital plate of eighth sternum tongue-shaped with rounded hind margin which reaches to hind margin of ninth sternum.

Male : Unknown.

Holotype : 1 ♀, Pagman, 17-VII-1960, R. Yosii.

Remarks : This new species is closely related to the North American *Alloperla diversa* Frison, but is easily distinguishable from the latter by the longitudinal stripe on the abdominal segments and the relative length of the subgenital plate.

No species of *Alloperla* was recorded from the Central Asia.

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A list of the Chrysomelidae collected by the Scientific Expedition of Kyoto University to Afghanistan in 1960 (Coleoptera)*

By
Shinsaku KIMOTO**

This paper is the result of my study on the leaf beetles which were collected by Prof. R. Yosii, a member of the Scientific Expedition of Kyoto University to Afghanistan in 1960. The literature cited under each species are merely the original descriptions and important monographical or synoptical works which were used for the identification. The species marked with asterisks were identified by Dr. I. K. Lopatin.

Before going further, I would like to express my cordial acknowlegment to Prof. R. Yosii, Kyoto University and Prof. T. Nakane, Kyoto Prefectural University, for their kindness in giving me the opportunity of studying this interesting collection. Also I wish to express my sincere thanks to Prof. K. Yasumatsu and Prof. H. Kuroko, Kyushu University, and Dr. I. K. Lopatin, Tadjik State University, USSR, for their kind encouragement and cooperation rendered during the completion of the paper.

Subfamily Criocerinae

1. **Oulema melanopa** (Linnaeus)

Chrysomela melanopa L., 1758, Syst. Nat. ed. 10: 376 (Europe).

Lema melanopa: Lacordaire, 1845, Mon. Phytoph. 1: 393. Reitter, 1912, Fauna Germ. 4: 82.

Oulema melanopa: Gressitt & Kimoto, 1961, Pac. Ins. Mon. 1A: 76, 77.

DISTRIBUTION: Europe, Madeira, N. Africa, Afghanistan, S. Siberia, Mongolia.

Borak (9 exs., 11. vii. 1960; 5 exs., 10. vii. 1960). Ishkashim (3 exs., 8. vii. 1960).

Subfamily Eumolpinae

*2. **Bedelia insignis** Lefèvre

Bedelia insignis Lef., 1875, Soc. Ent. France, Bull. 5, 5: xi (Persien).

DISTRIBUTION: Iran, Afghanistan.

Borak (2 exs., 12. vii. 1960; 7 exs., 10. vii. 1960). Kabul (9 exs., 20. vi. 1960).

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* Contribution Ser. 2, No. 20. Hikosan Biological Laboratory, Kyushu University, Hikosan.

** Hikosan Biological Laboratory, Faculty of Agriculture, Kyushu University, Hikosan.

Subfamily Chrysomelinae

3. Dlochrysa fastuosa subsp. **venticosa** (Suffrian)

Chrysomela venticosa Suffrian, 1868, Soc. Ent. France, Ann. 3, 6: 539 (Neapel).

Dlochrysa fastuosa subsp. *venticosa:* Bechyne, 1950, Ent. Arb. 1: 174 (S. & C. Italia, S. Spain).

DISTRIBUTION: S. Europe, Afghanistan.

Borak (9 exs., 11. vii. 1960).

The above listed specimens belong to the subsp. *venticosa* (Suffrian). According to Bechyne (1950), this subspecies is dominant in "1' Italia centrale et medionale et en Espange meridionale", and the nominate subspecies is in "Europe centrale, occidentale et les pay limitorphes de l'Asia."

Subfamily Galerucinae

4. Theone octocostata (weise)

Leptosonyx octocostata Weise, 1912, Archiv. Naturg. 28 A (2) : 92 (Kashmir).-- Maulik, 1936, Fauna India, Galeruc., 75.

Theone octocostata: Ogloblin, 1936, Fauna USSR 26, 1: 61, 382, fig. 25 (Ferghana, Pamir, Baluchistan).--Gressitt & Kimoto, 1963, Pac. Ins. Mon. 1B: 405 (c. Asia, ? China).

DISTRIBUTION: Ferghana, Pamir, Iran, Baluchistan, India (Kashmir), Afghanistan.

Ishkashim (10 exs., 29. vii. 1960). Borak (1 ex., 5. ix. 1960). Qasi Deh (1 ex., 16. vii. 1960).

Subfamily Alticinae

5. Chaetocnema (Chaetocnema) hortensis (Geoff. ap. Foucroy)

Altica hortensis Geoff. ap. Foucroy, 1785, Ent. Paris 1 : 98 (Europe).

Chaetocnema (*Chaetocnema*) *hortensis:* Heikertinger, 1951, Kol. Rundsch. 32: 54, 66 (Caucasus, C. Asia, Siberia, China).

DISTRIBUTION: Caucasus, SW Asia, Afghanistan, Siberia, ? E. China.

Faizabad (1 ex., 5. vii. 1960; 13 exs., 6. vii. 1960). Borak (1 ex., 12. vi. 1960).

6. Chaetocnema psylloides Pic

Chaetocnema psylloides Pic, 1909, Echange 25: 139 (Asia occidentale). -- Heikertinger, 1951, Kal. Rundsch. 32: 201 (Buchara, Taschkent, Kulu, Mesopotamia).

DISTRIBUTION: Buchara, Tashkent, Himalaya (Kulu), Mesopotamia, Afghanistan.

Faizabad (1 ex., 5. vii. 1960; 2 exs., 6. vii. 1960). Karezmul (5 exs., 18. vi. 1960).

I could not find any distinct difference between the specimens collected by

Dr. Yosii and those indentified by Dr. Lopatin.

7. Mantura rustica (Linnaeus)

Chrysomela rustica L., 1766, Syst. Nat. ed. 12, 595 (Europe).

Mantura rustica: Heikertinger, 1951, Kol. Rundsch. 32: 156 (N. & M. Europe, Sardinen, Mesedonien, Bosporus, Kaukasus, Kurdistan, Buchara, Turkestan, Siberia, Wladiwostock).

DISTRIBUTION: Europe, Siberia, SW Asia, Afghanistan.

Faizabad (1 ex., 6. vii. 1960).

***8. Longitarsus pratensis** (Panzer)

Altica pratensis Panzer, 1794, Faun. Ins. Germ., 21: 16 (Europe).

Longitarsus pratensis: Heikertinger, 1912, IN Reitter, Fauna Germ. 4: 191, pl. 146, fig. 26.

DISTRIBUTION: Europe, Canary Is., Caucasus, Turkestan, Afghanistan.

Karezmul (3 exs., 18. vi 1960).

***9. Longitarsus desertorum** Heikertinger

Longitarsus desertorum Hktg., 1913, Ent. Blätt., 9: 69, fig. 5 (Turkestan).

DISTRIBUTION: Turkestan, Afghanistan.

Borak (1 ex., 10. vii. 1960). Kabul (1 ex., 20. vi. 1960).

***10. Longitarsus spilotus** Weise

Longitarsus spilotus Weise, 1900, Archiv. Naturg. 1: 294 (Turkestan).

DISTRIBUTION: Turkestan, Afghanistan.

Faizabad (1 ex., 6. vii. 1960).

***11. Phyllotreta cruciferae** (Goeze)

Chrysomela cruciferae Goeze, 1777, Ent. Beytr. 1: 312 (Europe).

Phyllotreta cruciferae: Heikertinger, 1912, IN Reitter, Fauna Germ., 4: 176.

DISTRIBUTION: Europe, N. & E. Africa, Caucasus, SE Asia, Afghanistan.

Faizabad (2 exs., 6. vii. 1960).

12. Phyllotreta talassicola Heikertinger

Phyllotreta talassicola Hktg., 1944, Kol. Rundschau 30 (4/6): 210 (Syr-Darja-Gebiet, Tal Talass).

DISTRIBUTION: Afghanistan, W. Siberia (Kazak).

Kabul (1 ex., 20. vi. 1960).

I could not find any distinct difference between this specimen and those identified by Dr. Lopatin.

***13. Aphthona armeniaca** Weise

Aphthona armeniaca Ws., 1889, Wien. Ent. Zeit. 7: 260 (Armenia).

--Heikertinger, 1944, Kol. Rundschau 30 (1/3): 71 (Caucasus, Transkaspien, Buchara, Afghanistan, Westturkestan).

DISTRIBUTION: Caucasus, Turkestan, Afghanistan.

Borak (1 ex., 10. vii. 1960).

***14. Altica deserticola** (Weise)

Haltica deserticola Ws., 1889, Soc. Ent. Ross., Hoae, 23: 570, 535 (C. Mongol : a : Amdo).

DISTRIBUTION: SE Russia, Caucasus, Turkestan, SW Asia, Afghanistan, Siberia, Sinkiang, Mongolia).

Borak (1 ex., 9. vii. 1960; 5 exs., 11. vii. 1960; 5 exs., 10. vii. 1960).

15. Altica suvorovi (Ogloblin)

Haltica suvorovi Ogl., 1921, Rev. Russe d'Ent. 17: 27, fig. 4 (Syr-Darja).

DISTRIBUTION: W. Siberia (Kazak), Afghanistan.

Ishkashim (11 exs., 30. viii. 1960; 2 exs., 25. viii. 1960).

Neuroptera of Iran and Afghanistan

By

Satoru KUWAYAMA*

By the kindness of Professor R. Yosii, I have had a good opportunity of looking over the interesting collection of Neuroptera which brought home from Iran in 1956 and Afghanistan in 1960 by the Kyoto University Biological Expedition. The material before me contains 11 specimens from Iran and 36 from Afghanistan. However, identification on some species will be postponed for future studies, due to the poor condition of specimens.

Family Osmylidae

1. **Osmylus** sp.

Specimen examined :- Afghanistan : Mt. Noshaq, 3200 m al. (1?, August 1, 1960, R. Yosii leg.).

Yosii caught each one of fore- and hindwings floating on a stream.

2. **Osmylus** (s. lat.) sp. Larva.

Specimens examined :- Afghanistan : Mt. Noshaq, 3200 m. al. (3 individuals, July 25, 1960, R. Yosii leg.).

Three larvae collected are measured about 6 mm in body length, and are presumably the second instar.

Family Chrysopidae

3. **Chrysopa carnea** Stephens

Chrysopa carnea Stephens, Illus. Brit. Ent. Mand., VI : 103 (1836) ; Killington, Mon. Brit. Neur., II : 187, Pl. XXIV, figs, 2B, 3 (1937) ; Kuwayama, Pac. Ins., IV : 365 (1962).

Chrysopa vulgaris Schneider, Sym. Mon. Gen. Chrys. : 68, Pl. VIII (1851).

Chrysopa microcephala Brauer, Haid. Nat. Abh., IV (4) : 6 (1851).

Specimens examined :-Afghanistan : Kabul (1?, May 20, 1960, R. Yosii leg.) ; Kunduz (1♂ 1♀, September 3, 1960, R. Yosii leg.) ; Faizabad (1♂ 1♀, July 5-7, 1960, R. Yosii leg.) ; Borak (1♂, July 10, 1960, R. Yosii leg.) ; Ishkashim (2♀♀, July 15 - August 29, R. Yosii leg.).

Judging from the record above indicated, it would appear to be one of the most common and widely spread species in Afghanistan. According to Killington, it occurs throughout Europe, Africa, Madeira, Mauritius, Asia Minor, Pales-

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tine, Turkestan, Iran, Mesopotamia, and India, and as far east as Taiwan. It has also been recorded from Japan.

4. **Chrysopa septempunctata** Wesmael

Chrysopa septempunctata Wesmael, Bull. Acad. Brux., VIII : 210 (1841); Schneider, Sym. Mon. Gen. Chrys. : 101, Pl. XXX (1851); Killington, Mon. Brit. Neur., II : 194, Pl. XXI, fig. 1, Pl. XXVI, fig. 1 (1937); Kuwayama, Pac. Ins., IV: 367 (1962).

Specimen examined:- Afghanistan : Borak (1♀, July 10, 1960, R. Yosii leg.).

The specimen at my disposal is form *pallens* Rambur. This species occurs throughout Europe and central Asia including Iran, India and Turkestan, and has also been recorded widely from Siberia, Sachalin, Japan, Korea, China, Taiwan, and Cambodia.

5. **Chrysopa sillemi** Esben-Petersen

Chrysopa sillemi Esben-Petersen, Wiss. Ergebn. Niederl. Exped. Karakorum u. Angrenz. Gebiet, I (Zool.): 234, Fig. 2 (1935).

Specimens examined:- Afghanistan : Faizabad (1♂, July 8, 1960, R. Yosii leg.); Borak (1♀, July 10, 1960, R. Yosii leg.).

This species was originally described from Maralbashi and Yarkand in Karakorum.

6. **Chrysopa phyllochroma** Wesmael

Chrysopa phyllochroma Wesmael, Bull. Acad. Brux., VIII : 209 (1841); Killington, Mon. Brit. Neur., II : 214, Pl. XXVII, fig. 1 (1937); Kuwayama, Pac. Ins., IV: 370 (1962).

Specimens examined:- Afghanistan : Kunduz (1♂ 1♀, September 3, 1960, R. Yosii leg.). Iran : Shuruh (1?, August 8, 1956, S. Azuma leg.).

This species has been recorded from Europe, Asia Minor, Caucasus, Siberia, China, Korea, and Japan.

7. **Chrysopa** sp.

Specimen examined:- Afghanistan : Faizabad (1♀, July 8, 1960, R. Yosii leg.).

This species closely resembles *Chrysopa yasumatsui* Kuwayama and *C. nanchanica* Navás from China, but it can easily be distinguished from the latters by the smaller size and the markings of head.

Family Myrmeleontidae

8. **Palpares solidus** Gerstaecker

Palpares solidus Gerstaecker, Mitt. naturw. Ver. Neu-Vorpom. u. Rügen, XXV : 113 (1893); Banks, Ann. Ent. Soc. Am., VI : 189, Pl. XIX, fig. 20 (1913).

Palpares validus Navás, Mem. Pont. Accad. Sci. Nuovi Lincei X : 12, Fig. 8 (1927).

Palpares solidus var. *valida*: Navás, Rev. R. Acad. Cien. Exact. Fis. Nat. Madrid, XXIV : 1, Fig. 1 (1928).

Specimens examined :- Afghanistan : Kabul (1♀, August 31, 1960, R. Yosii leg.). Iran : Shuruh (2♀♀, August 8, 1956, S. Azuma leg.).

Giant but elegant species. One specimen at my disposal is measured 150 mm in wing expanse. *P. validus* Navás and *P. solidus* var. *valida* Navás, both from Kabul, agree in all details of the description with *P. solidus* described from Mesopotamia, and may be synonyms.

9. **Neuroleon arenarius** (Navás)

Myrmeleon arenarius Navás, Butll, Inst. Cat. Hist. Nat. : 24 (1904).

Neuroleon arenarius: Esben-Petersen, Ent. Medd., XII : 111, Pl. II, fig. 7 (1918).

Myrmeleon variegatus Rambur, nec Klug, Hist. Nat. Ins., Névrop. : 400 (1842).

Neuroleon syrus Navás, Mem. Pont. Accad. Sci. Nuovi Lincei, X : 16, Fig. 10 (1927).

Specimens examined :- Afghanistan : Faizabad (2♂♂, July 7, 1960, R. Yosii leg.); Borak (1♂ 1?, July 10, 1960, R. Yosii leg.).

This species is hitherto known from southern Europe and Asia Minor.

10. **Myrmecaelurus trigrammus** (Pallas)

Myrmeleo trigrammus Pallas, Reise Russ., I : 469 (1771).

Myrmecaelurus trigrammus: Esben-Petersen, Ent. Medd., XII : 120, Pl. VII, fig. 20 (1918).

Myrmeleon flavus Rambur, Hist. Nat. Ins., Névrop. : 398 (1842).

Specimens examined :- Afghanistan : Borak (2♂♂, July 10-11, 1960, R. Yosii leg.).

According to Esben-Petersen, this species occurs in the Mediterranian region, south Russia, Caucasus, and so on.

11. **Cueta lineosa** (Rambur)

Myrmeleon lineosus Rambur, Hist. Nat. Ins., Névrop. : 389 (1842).

Cueta lineosa: Esben-Petersen, Ent. Medd., XII : 121, Pl. VIII, fig. 23 (1918); Kimmins, Ann. Mag. Nat. Hist., ser. 11, X : 154, Fig. 8 (1943).

Specimen examined :- Iran : Bayez (1♂, August 15, 1956. Takaya leg.).

This species is hitherto known from Asia Minor, Caucasus, Egypt, Algeria, and so on.

12. **Acanthaclisis occitanica** (Villers)

Myrmeleon occitanicum Villers, Ent. Linn., III : 63, Pl. VII, fig. 10 (1789).

Acanthaclisis occitanica : Rambur, Hist. Nat. Ins., Névrop. : 378 (1842) ; Esben-Petersen, Ent. Medd., XII : 127, Pl. X, fig. 29 (1918).

Specimen examined : -Afghanistan : Borak (1♂, September 9, 1960, R. Yosii leg.).

This species is formerly found in south and central Europe, Russia, and central Asia.

Family Ascalaphidae

13. **Ascalaphus** (s. lat.) sp. Larva.

Specimen examined : - Afghanistan : Mt. Noshaq, 3200 m al. (1 individual, July 26, 1960, R. Yosii leg.).

Length, inclusive of jaws, is about 15 mm. Morphological character apparently resembles that of ? *Hybris borneenis* Weele drawn by van der Weele in 1908 [Coll. Zool. Edm. Selys Longch., VIII : 239].

Some aquatic and semiaquatic bugs from Afghanistan

By

Syôiti MIYAMOTO *

I examined only two water striders and three aquatic bugs collected in the Hindukush Expedition of Kyoto University, 1960. From the material, though very small, the aquatic Heteropterous fauna of Afghanistan seems to have close relation to that of Europe or particularly to that of the Mediterranean Region.

I express my hearty thanks to Dr. R. Yosii of Kyoto University, who gave me a chance to study material.

Veliidae

1. **Velia (Plesiovelia) affinis marussii** Tamanini, 1957

Velia (Plesiovelia) affinis marussii Tamanini, 1957, Atti Mus. Civ. Stor. Nat. Trieste *21* (2) : 32.

5 young nym.: Kabul, 10. vi. 1960, R. Yosii: 1 ♀: Pagman, 17. vi. 1960, R. Yosii; 2 ♀♀, 1 nym.: Istalif, 26. vi. 1960, R. Yosii; 1 ♀, 8 nym.: Borak, 12. vii. 1960, R. Yosii; 1 nym.: Tilgran, 15. vii. 1960, on the Kokcha River, R. Yosii; 1 ♀, 2 nym.: Kaz Deh, 15. vii. 1960, R. Yosii.

This subspecies is only known from the Hindukush, but the nominate form distributes over Iran and another subspecies, *filippi* Tamanini over the E. Mediterranean Region.

Gerridae

2. **Gerris (Gerris) costai** (Herrich-Schäffer, 1853)

Gerris (Gerris) costai: Hoberlandt, 1954, Acta Ent. Mus. Nat. Pragae *29*: 145; Poisson, 1957, Faun. France *61* : 231.

? ♀: Pagman, 10. vi. 1960, R. Yosii: 2 ♂♂, 1 ♀, 11 nym.: Borak, 12. vii. 1960, R. Yosii.

This water strider has widely known from Europe to Iran through SW Asia and may be new record for Afghanistan.

Notonectidae

3. **Notonecta viridis mediterranea** Hutchinson, 1928

Notonecta viridis mediterranea: Hungerford, 1933, Sc. Bull. U. Kansas *21* (1): 63: Poisson, 1957. Faun. France *61* : 141.

4 ♀♀ (2 of them crushed), 6 nym.: Kabul, 25. vi. 1960, R. Yosii; 2 nym.: Kaz Deh, 15. vii. 1960, R. Yosii.

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* Biological Laboratory, General Education Department, Kyushu University.

This has wide distribution from the Mediterranean Region to India through Asia Minor. Dr. L. Hoberlandt (1961, p. 221) recorded *N. viridula viridula* Delcourt from N. Afghanistan, but 4 ♀♀ before me all indicate characters of *N. viridula mediterranea*.

Corixidae

4. **Sigara (Vermicorixa) lateralis** (Leach, 1818)

Sigara (*Vermicorixa*) *lateralis*: Poisson, 1957, Faun. France *61*: 103; *S.* (*V.*) *lateralis lateralis*: Hoberlandt, 1961, Beiter. naturk. Forsch. SW-Deutschl. *19* (3): 222.

39 ♂♂: Kabul, 22. vi. 1960, R. Yosii; 2 ♂♂: Istalif, 24. vi. 1960, R. Yosii; 16 nym. presumably of this species: Ishkashim, 3. ix. 1960. in a pond, R. Yosii.

This species is widely spreading from the Mediterranean Region, through Asia Minor, Iran and Afghanistan, east to India and to Tibet and China.

5. **Corixa** (s. lat.) sp.

1 nym.: Ishkashim, 30. viii, 1960, R. Yosii; 13 nym.: Ishkashim, 3. ix. 1960, in the same pond where the nymphs of *Sigara lateralis* collected, R. Yosii.

Literature

HOBERLANDT, L., 1954, Hemiptera-Heteroptera from Iran, 1. Acta Ent. Mus. Nat. Pragae *29*: 121-148, 6 textfigs.

————————, 1961, Ergebnisse der Deutschen Afghanistan-Expedition 1956 der Landessammlungen für Naturkunde in Karlsruhe. Heteroptera. Beitr. naturk. Forsch. SW-Deutschl. *19* (3): 197-222, 30 textfigs.

HUNGERFORD. H. B., 1933, The genus *Notonecta* of the world. Sc. Bull. U. Kansas *34* (5): 5-160, 17 pls.

POISSON, R., 1957, Hétéroptères aquatiques. Faune de France *61*: 1-263, 185 textfigs.

TAMANINI, L., 1957, *Velia affinis marussii* mihi del Hindu-Kush or. Dedicesimo contributo allo studio del genere *Velia* Latr. (Heteroptera, Veliadae). Spedizione italian al Karakorum ed al Hindu-Kush primi risultati dello studio delle Raccolte Zoologiche (1954-1955). Atti Mus. Civ. Stor. Nat., Trieste *21* (2): 32-37, 11 textfigs.

Curculionidae from Afghanistan*

By

Katsura MORIMOTO

The material collected by Dr. R. Yosii during the Kyoto University expedition to Afghanistan in 1960 comprises 27 examples belonging to 16 species of the Curculionidae, of which 4 are new to the fauna of Afghanistan.

1. **Apion (Erythrapion) substriatum** Schilsky, 1902

Specimen examined: 1 ♂, Faizabad, 6. VII. 1960.
Distribution: Transcaucasus, Afghanistan.

2. **Apion (Ceratapion)** sp.

Specimen examined: 1 ♀, Faizabad, 6. VII. 1960.

3. **Sitona crinita** (Herbst, 1795)

Specimens examined: 4 ex., Faizabad, 6. VII. 1960.
Distribution: Europe, North Africa, Turkey, Caucasus, Turkistan, Afghanistan, North America.

4. **Sitona lineella** (Bonsdorff, 1785)

Specimen examined: 1 ex., Faizabad, 6. VII. 1960.
Distribution: Europe, Afghanistan, Siberia, Mongolia, Kamchatka.

5. **Sitona munganasti** Reitter, 1903

Specimen examined: 1 ex., Faizabad, 8. VII. 1960.
Distribution: Caucasus, Afghanistan (- new record).

6. **Sitona suturalis** Stephens, 1831

Specimens examined: 1 ex., Karezmyl, 18. VI. 1960; 1 ex., Kabul, 20. VI. 1960.
Distribution: Palaearctic region, Afghanistan (- new record).

7. **Chlorophanus** sp.

Specimen examined: 1 ex., Ishkashim, 25. VIII. 1960. (in bad condition).

8. **Otiorrhynchus (Tournieria) hindukuschensis** Voss. 1959

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* Contribution Ser. 2, No. 93, Entomological Laboratory of Kyushu University.

Specimens examined: 1 ex., Mt. Noshaq, 3800 m, 18. VII. 1960; 1 ex., same locality, 3040 m, 31. VII. 1960.
Distribution: Afghanistan.

9. **Myllocerus benignus** Faust, 1892

Specimen examined: 1 ex.. Borak, 10. VII. 1960.
Distribution: Turkmenistan, Afghanistan (- new record).

10. **Chloebius immeritus** Boheman, 1834

Specimen examined: 1 ex., Borak, 10. VII. 1960.
Distribution: Southern Russia, Caucasus, Turkmenistan, Turkistan, Afghanistan (- new record).

11. **Chloebius** sp. prope **psittacius** Boheman, 1843

Specimen examined: 1 ex., Faizabad, 8. VII. 1960.

12. **Chloebius steveni** Boheman, 1843

Specimen examined: 1 ex., Borak, 10. VII. 1960.
Distribution: Caucasus, Turkmenistan, Armenia, Afghanistan (- new record).

13. **Hypera variabilis** (Herbst, 1795)

Specimens examined: 2 ex., Karezmyl, 19. VI. 1960.
Distribution: Europe, North Africa, Siberia, Turkistan, Afghanistan.

14. **Chromonotus confluens** (Fåhraeus, 1842)

Specimens examined: 5 ex., Khanabad, 4. VII. 1960.
Distribution: Transcaspia, Turkistan, Afghanistan.

15. **Calosirus pulvinatus** (Gyllenhal, 1831)

Specimen examined: 1 ex., Faizabad, 6. VII. 1960.
Distribution: Europe, Siberia, Turkey, Transcaucasus, Afghanistan.

16. **Smicronyx balassogloi** Faust, 1885

Specimens examined: 2 ex., Faizabad, 6. VII. 1960.
Distribution: Turkistan, Afghanistan.

Records of Yponomeutid-moths from Afghanistan collected by Prof. R. Yosii in 1960*

By

Sigeru Moriuti**

Through the courtesy of my colleague, Mr. Tosirô Yasuda, I had an opportunity to examine the three following Afghan Yponomeutids, which were collected by Prof. Riôzô Yosii, of the Kyoto University, in 1960.

Plutellidae, s. str.

1. **Plutella maculipennis** (Curtis, 1832)

Specimen examined: 1♀ (head missing), Ishkashim, 26 VIII 1960 (R. Yosii).

The specimen in bad condition; I have examined the genital structure and there is no doubt about its specific identity.

Cosmopolitan species.

Yponomeutidae, s. str.

2. **Yponomeuta padellus** (Linné, 1758)

Specimens examined: 1♂, Gorband, 1 VII 1960 (R. Yosii); 1♀ (right forewing missing), Suffian, 12, VII 1960 (R. Yosii).

Forewing of the male specimen white, and that of the female slightly suffused with pale grey.

Palaearctic and nearctic species.

3. **Yponomeuta** sp.

Specimen examined: 1♂, Borak, 12 VII 1960 (R. Yosii).

Probably an undescribed species but the present specimen is not in sufficiently good condition to warrant description.

I wish to express my hearty thanks to Mr. T. Yasuda and Prof. R. Yosii for giving me the chance to examine the material in the present paper.

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* Studies on the Yponomeutoidea (X)

** Entomological Laboratory, College of Agriculture, University of Osaka Prefecture, Sakai.

Coleoptera of Afghanistan

By

Takehiko NAKANE*

HISTERIDAE

Only one Histerid-beetle was obtained during the Kyoto University Hindukush Expedition.

Subfamily Saprininae

Saprinus (s. str.) **schmidtianus** Reitter, 1887 (Fig. A)

Horae Soc. Ent. Ross., XX, p. 218.

AFGHANISTAN: Mt. Noshaq, 4000 m. alt., 1 ♂, 3-VIII-1960, R. Yosii leg.

Distribution: Turkestan, Chinese Turkestan, N. India, Pamir.

REICHARDT (Rep. Pamir. Exped., II, 1930, p. 10.) described subsp. **pamiricus** from Pamir, which has an indistinct greenish lustre on the black body surface. The unique example before me is almost lacking in metallic lustre and quite black, though its locality lies near to the territory of subsp. **pamiricus.**

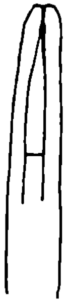

Fig. A Penis of *Saprinus* (s. str.) *schmidtianus* Reitter from Mt. Noshaq.

SCARABAEIDAE

The material procured during the Kyoto University Expeditions to Iran and Afghanistan contains 16 species of Scarabaeidae.

Subfamily Hybosorinae

Hybosorus illigeri Reiche, 1853

Ann. Soc. Ent. France, 3, I, p. 88.

IRAN: Bayez, 1 ex., 15-VIII-1956, S. Azuma leg.

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* National Science Museum, Tokyo.

Distribution: S. Europe, Africa, Asia minor, Turkmenia, Iran. India.

Subfamily Aphodiinae

Aphodius (Loboparius ?) tilgranicus sp. nov. (Fig. B)

Black, shining, with apical portions of elytra and legs more or less reddish, antennae, palpi and tarsi reddish testaceous and partly infuscate.

Rather short and stout, highly convex above and glabrous.

Head finely but distinctly and not so closely punctured, the punctures somewhat obscured in front by longitudinal wrinkles. Anterior margin of clypeus feebly emarginate in middle and rounded on both sides. Cheeks rather small, rounded, hardly prominent beyond eyes and separated from clypeus by a fine but distinct incision. Frontal suture feebly raised, with a weak median tubercle. Clypeus with a short transverse carina between anterior margin and frontal suture.

Pronotum sparsely and very finely punctured and scattered with coarse punctures irregularly set. Sides gently rounded and finely margined, with front angles obtuse, and hind angles broadly rounded. Basal margin also finely but distinctly margined. Scutellum finely and sparsely punctured, with sides parallel at base.

Elytra scarcely wider than prothorax, about a third longer than wide, subparallel-sided on basal half and commonly rounded apically. Striae rather fine but sharply impressed, with strial punctures not so coarse and feebly notched the intervals, which are nearly flat and very finely and sparsely punctured. Sutural interval narrowed and becoming convex near apex. Fourth to 7th striae showing the tendency to union before apex of elytra.

Protibiae bearing 3 outer teeth and a normal apical spur. Apical setae of

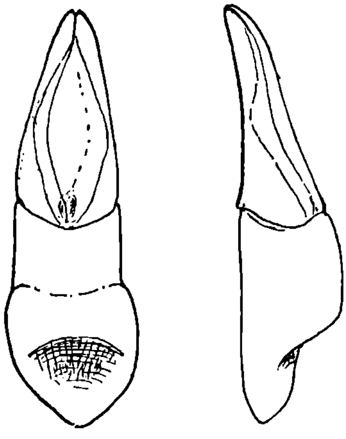

Fig. B Male genitalia of *Aphodius tilgranicus* sp. nov.

metatibia unequal in length, Metatarsus as long as the following two joints together.

Body length: 6 mm.

Holotype: ♂, Tilgran, Badakhshan, Afghanistan, 13-VII-1960, R. Yosii leg.

This species is somewhat allied to **A. (L.) scheibei** Balthasar, but the cheeks are only weakly prominent, the clypeus bears a transverse carina, and the apical setae of the metatibia are unequal in length.

Aphodius (Liothorax) matthiesseni Reitter, 1907

Deutsche Ent. Zeitschr., 1907, p. 407.

IRAN: Bayez, 3 ex., 15-VIII-1956, S. Azuma leg.

Distribution: Iran.

It is closely allied to **A. (L.) lividus** (Olivier), but the body is relatively larger and the punctuation of the prothorax is different.

Pleurophorus afghanus Balthasar, 1955

Acta Mus. Nat. Pragae, XXX, 466, p. 423.

AFGHANISTAN: Faizabad, 1 ex., 6-VII-1960, R. Yosii leg.

Distribution: Afghanistan.

Heptaulacus sus (Herbst, 1783)

in Füssly, Arch., IV, p. 9, pl. 19-f. 14 (*Scarabaeus*).

IRAN: Persepolis, 2 ex., 27-VIII-1956, K. Takaya leg.

Distribution: Europe, Transcaspia, Iran.

Rhyssemus histrio Balthasar, 1961

Acta Soc. Ent. Czechosl., LVIII, 2, p. 128, f. 4.

IRAN: Kerman, 2 ex., VIII-1956, S. Azuma leg.

Distribution: Afghanistan, Iran.

Recently described by BALTHASAR from Kandahar-Kuna, Afghanistan.

Subfamily Scarabaeinae

Scarabaeus sacer babori Balthasar, 1934

Ent. Blätter, XXX, p. 147.

AFGHANISTAN: Kabul, 1 ex., 16-VI-1960, R. Yosii leg.; Kabul, 1 ex., 11-VI-1955; Istalif, 2 ex., 26-VI-1960, R. Yosii leg.

Distribution; Iran, Afghanistan, Turkestan, Caucasus, Transcaspia.

Gymnopleurus flagellatus (Fabricius, 1787)

Mant. Ins., 1787, p. 17 (*Scarabaeus*).

AFGHANISTAN; Istalif, 9 ex., 26-VI-1960, R. Yosii leg.; Charikar, 1 ex., 1-VII-1960, R. Yosii leg.

PAKISTAN; Chaman, 6 ex., 2-VI-1955.

Distribution; S. Europe, S. Russia, Armenia, Palestine, Iran, Afghanistan, Pakistan, Kashmir, Baluchistan, Waziristan, N. Africa.

Three specimens from Afghanistan (two from Istalif and one from Charikar

: Syntypes) differ from others in having the punctuation of the upper surface being distinctly smaller and the lateral carina of the lst abdominal segment bifurcate on the hind half. I name this form subsp. **problematicus** nov. preliminary.

Gymnopleurus aciculatus Gebler, 1841

Bull. Acad. Petrop., VIII, p. 372.

AFGHANISTAN: Ishkashim, 1 ex., 15-VII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan, Kirghisian Steppe, Transcaspia, Lenkoran.

Gymnopleurus mopsus (Pallas, 1781)

Icon, Ins., 1781, p. 3, pl. A-f. 3 (*Scarabaeus*).

AFGHANISTAN: Faizabad, 1 ex., 5-VII-1960, R. Yosii leg.

Distribution: Europe, Dalmatia, Caucasus, Iran, Afghanistan, Syria, China, N. Africa.

Subfamily Melolonthinae

Polyphylla (Xerasiobia) adspersa pulverea Ballion, 1870

Bull. Soc. Nat. Mosc., XLIII, p. 342.

AFGHANISTAN: Taliqan, 3 ex., 4-VII-1960, R. Yosii leg.; Taliqan-Kishim, 1 ex., 5-VII-1960, R. Yosii leg.

Distribution: Transcaucasus, Cruzia, Armenia, Iran, Central Asia, Afghanistan.

BALTHASAR (1955) reported this from Faizabad, Kabul, Borak and Pagman.

Dasytrogus transcaspicus (Brenske, 1886)

Deutsche Ent. Zeitschr., XXX, p. 200 (*Amphimallus*).

AFGHANISTAN: Borak, 1 ex., 11-VII-1960, R. Yosii leg.; Zebak, 1 ex., 13-VII-1960, R, Yosii leg.

Distribution: Transcaspia, Turkmenia, Uzbek, Afghanistan.

Subfamily Rutelinae

Adoretus (s. str.) **nigrifrons** (Steven, 1809)

Mém. Soc. Nat. Mosc., II, p. 41 (*Melolontha*).

PAKISTAN: Chaman, 1 ex., 2-VI-1955.

Distribution: Caucasus, Central Asia, Iran, Afghanistan, Pakistan, etc.

Subfamily Dynastinae

Oryctes nasicornis afghanistanicus Endrödi, 1938

Arch. Naturg., (N. F.), VII, p. 88, f.

AFGHANISTAN: Kabul, 1 ex., 16-VI-1960, R. Yosii leg.

Distribution: Afghanistan.

Subfamily Cetoniinae

Oxythyrea cinctella (Schaum, 1841)

Analecta Ent., 1841, p. 38 (*Cetonia*).

AFGHANISTAN: Borak, 5 ex., 10-VII-1960, R. Yosii leg.; Borak, 1 ex., 11-VII-1960, R. Yosii leg.

PAKISTAN: Chaman, 2 ex., 2-VI-1955.

Distribution: S. Europe, Afghanistan, Baluchistan.

SCHEIN (1955) described **O. mülleri** from Afghanistan, which is closely related to the present species, but our specimens appear to me to be **O. cinctella.**

Potosia (s. str.) **bucharica** Curti, 1915

Ent. Mitteil., IV, 1, p. 22.

AFGHANISTAN: Borak, 1 ex., 10-VII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

Potosia (Netocia) bogdanoffi (Solsky, 1875)

Horae Soc. Ent. Ross., XI, p. 277 (*Cetonia*).

AFGHANISTAN: Zebak, 1 ex., 13-VII-1960, R. Yosii leg.

Distribution: Central Asia, Afghanistan.

BUPRESTIDAE

A specimen of Buprestidae collected during the Kyoto University Hindukush Expedition was determined by Dr. Yoshihiko KUROSAWA, National Science Museum, Tokyo, as below.

Pseudocastalia semenovi Obenberger, 1934

Folia Zool. et Hydrobiol., V, p. 188.

AFGHANISTAN: Kunduz, 1 ♂, 4-VII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

Originally reported from Tashkent, and probably new to the fauna of Afghanistan.

LAMPYRIDAE

Only one species of Lampyrids was brought back from Afghanistan.

Subfamily Lampyrinae

Lampyris olivieriana Heyden, 1890 (Fig. C)

Deutsche Ent. Zeitschr., 1890, p. 359.

AFGHANISTAN: Borak, 1 ♂, 10-VII-1960, R, Yosii leg.

Distribution: Turkestan, Afghanistan.

The unique example from Borak differs from the description of Heyden in the following points:

The prothorax narrower and its lateral margins scarcely sinuate before hind angles, the apical margin of anal tergite not so remarkably bisinuous.

I propose here temporarily a name, subsp. **afghana** nov. for this insect.

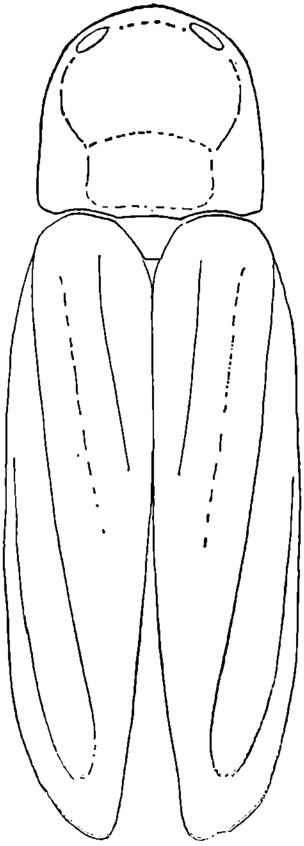

Fig. C *Lampyris olivieriana afghana* nov.

ELATERIDAE

Two species of Elaterid-beetles were collected by Prof. Dr. R. YOSII during the Kyoto University Hindukush Expedition, and both apparently belong to the genus **Negastrius.**

Subfamily Negastriinae

Negastrius yosiii sp. nov. (Fig. D: 1—2.)

Reddish testaceous, with prothoracic peripheral ridges, prosternal process, metasternum, middle coxae, coxal plates, and usually abdomen (except apical portion) more or less brownish, head above and elytra blackish brown, and legs yellow. Body above clothed with whitish curved hairs rather closely, and beneath densely covered with short griseous pubescence and not closely bearing whitish recumbent hairs.

Head above flattened, with the crest entire and slightly arched-produced, surface rather coarsely but not closely punctured. Antennae rather stout, with 1st joint subcylindrical, moderately thickened and slightly curved, 2nd about half as long as 1st, 3rd elongate, a half longer than 2nd, 4th a little shorter than 3rd, 4th to 10th triangularly dilated, progressively but very gradually diminishing their length, 11th nearly as long as 9th and acuminated from middle to apex.

Prothorax wider than long, widest behind middle, with sides weakly arched and sinuate before base, frontal margin sublinear in middle, front angles triangularly projected forwards, hind angles diverging backwards and acutely produced, with a carina extending from hind angle to front corner, disc not closely bearing oblong coarse punctures. Scutellum triangular, longitudinally raised at middle of base, with sides somewhat arched near apex, surface flattened and scattered with a few punctures.

Elytra strongly punctate-striate, strial punctures strong and especially coarse in outer striae, dorsal intervals nearly flat or slightly convex, outer three intervals more or less carinate anteriorly, each interval bearing a row of distinct punctures.

Under surface moderately closely and coarsely punctured, but prosternum and median part of abdomen relatively finely and less closely punctured. Legs rather slender.

Body length: 4.9-5.5 mm.

AFGHANISTAN: Holotype (♂), allotype (♀) & 2 paratypes: Pagman, 10-VI-1960, R. Yosii leg.

Easily distinguishable from other members of the genus by the coloration of the body and the prolonged carina above the lateral margins of pronotum.

Negastrius pagmanus sp. nov. (Fig. D: 3-5.)

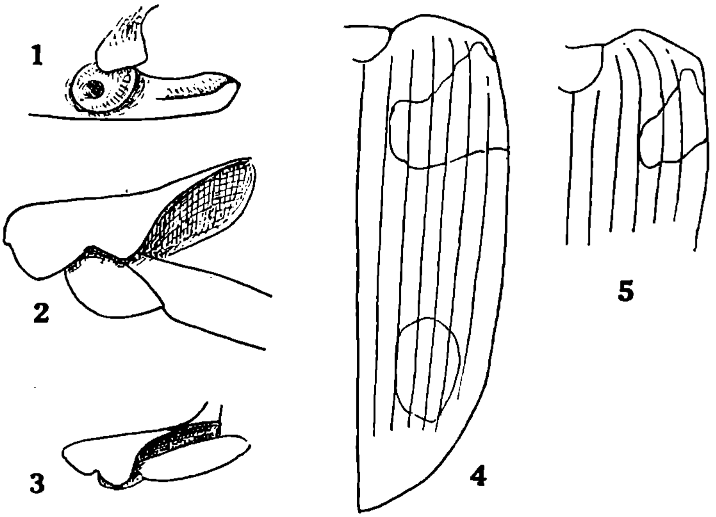

Fig. D: 1-2. *Negastrius yosiii* sp. nov.; 1. prosternal process in profile. 2. left coxal plate.
Fig. D: 3-5. *Negastrius pagmanus* sp. nov.; 3. left coxal plate; 4. pattern of right elytron (♀); 5. ditto (♂).

Black or blackish brown, with the anterior area of prosternum including gular plate, pronotal front angles, antennae, palpi, legs, pro- and mesocoxae, a subhumeral spot and often a postmedian spot of each elytron testaceous, and hind angles of pronotum more or less reddish.

Head and pronotum minutely and densely but faintly granulate, covered with fine griseous hairs. Head gently convex above, frontal crest nearly evenly arcuate. Antennae just reaching base of pronotum, with 1st joint oval, thickened, 2nd cylindrical and distinctly shorter than 1st, 3rd not longer than 2nd, 4th to 10th triangularly but not so strongly dilated, progressively diminishing their length, 4th longer than 3rd, and 11th subequal to 4th in length, ovate and acuminated from middle to apex.

Pronotum nearly as long as wide, with front angles depressed downwards and shortly triangularly produced when seen from above, hind angles acutely and triangularly prominent backwards, sides feebly rounded and slightly sinuate before base, carina well developed and prolonged forwards far beyond the middle and only abbreviated in front, and disc convex with a trace of a median carina. Scutellum rounded triangular, flattened, minutely punctulate, and sides arched with a nodulous elevation at middle of each.

Elytra a little less than twice as long as wide, finely but distinctly striate, covered with griseous recumbent hairs, and intervals nearly flat, bearing minute punctures rather closely.

Prosternum finely and closely punctured and other parts of under surface minutely and densely punctured throughout.

· Body length: 2.3 (♂) - 2.7 (♀) mm.

AFGHANISTAN: Holotype (♂) & allotype (♀): Pagman, 10-VI-1960, R. Yosii leg.

Differs from other species of the genus with maculate elytra in having prolonged carina of the hind angles of pronotum and in the shape of the patches of elytra.

CANTHARIDAE

Two species of Cantharidae were obtained during the Kyoto University Expedition to Hindukush.

Cantharis attalia Pic, 1902

L'Echange, XVIII, p. 55; XXX, 1914, p. 5 (*C. athalia*).

AFGHANISTAN: Kabul, 1 ex., 10-VI-1960, R. Yosii leg.; Borak, 1 ex., 10-VIII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

PIC (1914) briefly characterized this species in the key to the species of **Cantharis** from Turkestan. According to DELKESKAMP (1939, in Junk Col. Cat. pars 165, p. 51) **C. attalia** Pic is synonymous with **C. dia** Reitter, 1898, from Tian-Shan. The examples above-mentioned are smaller than the length mentioned in PIC's key.

Cantharis lucida Pic, 1906

L'Echange, XXII, p. 89.

AFGHANISTAN: Kabul, 1 ex., 17-VI-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

WITTMER (1956) also recorded this species from several places of Afghanistan with some hesitation.

DERMESTIDAE

A cosmopolitan species of Dermestidae was obtained by Prof. UMESAO at Kabul.

Subfamily Attageninae

Attagenus piceus (Olivier, 1790)

Entom., II, 9, p. 10, t. 1-f. 4 (*Dermestes*).

AFGHANISTAN: Kabul, 1 ♀, 2-VII-1955, T. Umesao leg.

Distribution: Cosmopolitan.

CLERIDAE

Subfamily Korynetinae

Necrobia rufipes (Degeer, 1775)

Mémoires, V. p. 165, t. 15-f. 4 (*Clerus*).

AFGHANISTAN: Kabul, 15 ex., 10-VI-1960, R. Yosii leg.

Distribution: Cosmopolitan.

According to Dr. YOSII this well-known pest of copra had been slipped into his baggage from the copra in the cargoes of S.S. Wakashima on the way to Afghanistan.

MELYRIDAE

Subfamily Malachiinae

Cephaloncus reitteri afghanistanus Wittmer, 1956

Rev. Suisse Zool., 63, p. 121.

AFGHANISTAN: Borak, 1 ♂, 10-VII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

Ebaeus turkestanicus Abeille de Perrin, 1885

Rev. d,Ent., IV, p. 146.

AFGHANISTAN: Kabul, 1 ♀, 20-VI-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

Blackish brown, with mouth parts, palpi, prothorax, apical half of femora, tibiae and tarsi yellow. Antennae yellow, but the apical joints and upper surface of scape more or less brownish. Apical portion of each elytron rather broadly flavous. Body length: ca. 3 mm.

Subfamily Dasytinae

Three species belonging to Dasytinae were also found by the members of the Kyoto University Hindukush Expeditions, but I cannot determine them at present.

NITIDULIDAE

Four examples of a **Meligethes**-species were captured by Prof. T. UMESAO at Kabul during the Kyoto University Hindukush Expedition. One of the specimens was sent to Dr. Alan M. EASTON, England, for determination.

Subfamily Meligethinae

Meligethes lepidii Müller, 1852
Verh. Zool.-Bot. Ges. Wien, I, p. 111.
AFGHANISTAN: Kabul, 2♂ 2♀, 2-VIII-1955, T. Umesao leg.
Distribution: Europe, Caucasus, Armenia, Syria, Afghanistan.
Dr. EASTON determined the species as above.

CRYPTOPHAGIDAE

Two species of Cryptophagid-beetles are found in the material collected by Prof. R. YOSII in Afghanistan.

Subfamily Cryptophaginae

Cryptophagus (s. str.) **skalitzkyi** Reitter, 1889
Deutsche Ent. Zeitschr., 1889, p. 311.
AFGHANISTAN: Mt. Noshaq, 3000 m. alt., 3♂ 2♀, 20-VII-1960, R. Yosii leg.
Distribution: Europe, Caucasus, Turkestan, Afghanistan.

I determined this species after BRUCE's monograph. In the examples before me the lateral margins of prothorax are somewhat more rounded than those in BRUCE's figure.

Subfamily Atomariinae

Anchicera sp.

AFGHANISTAN: Mt. Noshaq, 3800 m. alt., 2 ex., 25 & 29-VII-1960, R. Yosii leg.

Pale testaceous, with head, a median transverse fascia of elytra, basal portion of prosternum, meso- and metathorax, and hind coxae more or less infuscate or brown, and pronotum slightly reddish. Prothorax transverse, narrowed in front and behind, with sides evenly rounded. Elytra oval, convex and acuminate behind. Body length : 1.7 mm.

LATHRIDIIDAE

Four examples of Lathridiidae representing two species were captured by Prof. R. YOSII during the Kyoto University Expedition to Hindukush.

Lathridius transversus (Olivier, 1790)

Entom., II, 18, p. 14, t. 3-f. 20,

AFGHANISTAN : Ishkashim, 2 ex., 30-VIII-1960, R. Yosii leg.

Distribution : Cosmopolitan.

Corticarina sp.

AFGHANISTAN : Ishkashim, 2 ex., 30-VIII-1960, R. Yosii leg. ; Taiwarra, 1 ex., 3-IX-1955, T. Umesao leg.

TENEBRIONIDAE

The material of the Kyoto University Expeditions to Iran, Afghanistan and Pakistan contains 17 species of Tenebrionidae. As regards the Tenebrionidae of the areas concerned numerous species have been described or reported by SCHUSTER, GRIDELLI, KÜHNELT and KASZAB.

Subfamily Zophosinae

Zophosis punctata nitida Gebler, 1845

Bull. Acad. Petrop., III, p. 100.

AFGHANISTAN : Faizabad, 1 ex., 5-VII-1960, R. Yosii leg. ; Kishim, 1 ex., 5-VII-1960, R. Yosii leg.

Distribution : Turkestan, Afghanistan.

Zophosis persica gridellii Kaszab, 1959

Ent. Arb. Mus. Frey, X, 2, p. 343.

PAKISTAN : Bhambur near Karachi, 1 ex., 6-VI-1960, R. Yosii leg.

Distribution : Afghanistan, Pakistan.

Zophosis sp.

IRAN : Maraghe, 2 ex., 9-X-1956, S. Azuma leg.

Subfamily Tentyriinae

Mesostena laevicollis Solier, 1835 ?

Ann. Soc. Ent. France, IV, p. 402.

IRAN : Kerman, 1 ex., 16-VIII-1956, K. Takaya leg.

Microdera badakschanica Kaszab, 1959

Ent. Arb. Mus. Frey, X, 2, p. 390, Pl. II-f. 15.

AFGHANISTAN : Borak, 1 ex., 10-VII-1960, R. Yosii leg. ; Shewa, Darwaz, 1 ex., 9-IX-1960, R. Yosii leg.

Distribution : Afghanistan.

Subfamily Adesmiinae

Adesmia (Oteroscelis) belutschistana Schuster, 1930

IRAN : Maraghe, 1 ex., 1-X-1956 ; Maraghe, 2 ex., 9/10-X-1956.

Distribution : Iran.

Adesmia (Macradesmia) servillei provincialis Kaszab, 1959

Ent. Arb. Mus. Frey, X, 2, p. 399, pl. III-f. 31.

PAKISTAN : Chaman, 1 ex., 4-VI-1955.

Distribution : Afghanistan, Pakistan.

This subspecies was described by KASZAB from Kandahar-Kuna, Afghanistan.

Subfamiliy Akidinae

Cyphogenia (Lechriomus) bienerti (Morawitz, 1865)

Horae Soc. Ent. Ross., III, p. 27.

AFGHANISTAN : Kunduz, 1 ex., 3-VII-1960, R. Yosii leg.

Distribution : Afghanistan, Iran.

Subfamily Pimeliinae

Ocnera pilicollis (Faldermann, 1836)

Bull. Soc. Nat. Mosc., IX, p. 378, pl. 7-f. 6.

AFGHANISTAN : Kunduz, 1 ex., 3-VII-1960, R. Yosii leg.

Distribution : Kirghisia, Transcaspia, Turkestan, Afghanistan.

Pachyscelis freyi Kaszab, 1960

Ent. Arb. Mus. Frey, XI, 1, p. 35, pl. IV-f. 43.

AFGHANISTAN : Kunduz, 1 ex., 4-VII-1960, R. Yosii leg.

Distribution : Afghanistan.

Pachyscelis freyi kabuliensis Kaszab, 1960

Ent. Arb. Mus. Frey, XI, 1, p. 37, pl. IV-f. 44.

AFGHANISTAN : Dumial, 4000 m. alt. (Punjab-Hindukush), 1 ex., 8-IX-1956.

Distribution : Afghanistan.

Pachyscelis banghaasi Reitter, 1893

Best.-Tab. Eur. Col., XXV, 1893, p. 208.

AFGHANISTAN : Borak, 1 ex., 12-IX-1960, R. Yosii leg.

Distribution : Turkestan, Afghanistan.

Pachyscelis sp.

IRAN : Neiriz, 2 ex., 23/24-VIII-1956, K. Takaya leg.

Subfamily Blaptinae

Blaps badakschanica Kaszab, 1960

Ent. Arb. Mus. Frey, XI, 1, p. 73, pl. VII-f. 77, text-f. 47, 48, 66.
AFGHANISTAN: Mt. Noshaq, 3800 m. alt., 1 ♂, 18-VII-1960, R. Yosii leg.
Distribution: Afghanistan.

Subfamily Platyscelinae

Platynoscelis (Pseudotrichoplatyscelis) badakschanica Kaszab, 1960
Ent. Arb. Mus. Frey, XI, 1, p. 83, pl. VII-f. 82, text-f. 67, 68.
AFGHANISTAN: Shewa, Darwaz, 12 ex., 9-IX-1960, R. Yosii leg.
Distribution: Afghanistan.

Subfamily Opatrinae

Gonocephalum tuberculatum (Hope, 1831)
in Gray's Zool. Misc., I, 1831, p. 31.
AFGHANISTAN: Kabul, 1 ex., 11-VI-1960, R. Yosii leg.
Distribution: India, Himalaya, China, Annam, Formosa, Pakistan, Afghanistan.

Gonocephalum rusticum (Olivier, 1811)
Encycl. Méth., VIII, 1811, p. 498.
AFGHANISTAN: Shewa, Darwaz, 1 ex., 9-IX-1960, R. Yosii leg.
IRAN: Ab-e-Garm, 1300m. alt. (Mt. Demavand), 1 ex., 28-VII-1956, S. Azuma leg.
Distribution: Mediterranean Region, N. Africa, S. Russia, Caucasus, Iran, Afghanistan, Turkestan, Mongolia.

Opatroides punctulatus Brullé, 1832
Exp. Morée, III, 1832, p. 220, pl. XL-f. 9.
AFGHANISTAN: Kishim, 1 ex., 5-VII-1960, R. Yosii leg.
Distribution: Mediterranean Region, N. Africa, Central Asia, Iran, Afghanistan.

Subfamily Crypticinae

Crypticus (s. str.) **yosiii** sp. nov.

Black or blackish brown, with mouth organs (except the tips of mandibles black), labrum, palpi, antennae, legs (including the coxae), anterior margin, preocular space and an obscure transverse band along the frontal suture of head reddish brown, scutellum and edges of pronotum more or less rufescent, and there is a small obscure spot on each side along the base of pronotum.

Oblong, weakly convex and opaque above. Head semicircular, finely and moderately closely punctured, with the anterior margin subtruncate in middle. Eyes rather small, transverse and slightly projecting laterally. Antennae hardly reaching the base of prothorax, rather short and narrow, with the 3rd joint cylindrical, nearly as long as 1st, about a third longer than 2nd or 4th, but narrower than 1st or 2nd, 4th to 10th progressively but very gradually diminishing their length, the last five joints slightly dilated and submoniliform, forming a loosely articulated club, and 11th oval and slightly longer than the preceding.

Prothorax transverse, about 1.6 times as wide as long, anterior and posterior margin sublinear, and the side margins subparallel on posterior third and then gently arcuate-convergent forwards to rounded front angles; disc rather finely but distinctly and moderately closely punctured, the punctuation somewhat sparser in middle. Scutellum triangular, and densely and rather finely punctured.

Elytra a half longer than wide, rather finely and moderately closely punctured, two rows of punctures present along the suture, and traces of striae observable on posterior parts; subparallel-sided in anterior half and rounded-narrowed to apex posteriorly.

Gular and pectoral surface granulated, with the exception of median area of metasternum, which is finely punctured, microreticulate and longitudinally sulcate along the median line. Abdomen microreticulate, strongly strigose longitudinally on each side, and finely punctured in middle.

Protibiae slightly curved, weakly dilated to apex, with the outer margin shortly spinose and the upper apical margin rounded-produced. Mesotibiae cylindrical and outwardly spinose, and metatibiae slender and dilated near apex, with the outer margin sparsely spinose and the terminal spurs unequal (the longer one nearly half as long as the basal joint of metatarsi). Protarsi rather short, with the lst joint triangularly dilated and nearly as long as the following three combined, which are short and transverse, progressively diminishing their width. Basal joint of metatarsi fully as long as the following three combined and the claw-joint slightly longer than the preceding two united.

Body length: 5.7 mm.

AFGHANISTAN: Holotype: ♀, Qasi Deh, 16-VI-1960, R. Yosii leg.

The present species resembles **C. latiusculus** Ménetries, but the body is somewhat smaller and opaque above, and the shape of the protibiae is different.

Subfamily Adeliinae

Laena dumialensis sp. nov.

Dark or blackish red-brown. Antennae and legs more or less paler in colour.

Shining, shortly covered with yellowish recumbent hairs. Antennae reaching the base of pronotum, rather robust, gradually thickened from middle to apex; 3rd joint a half longer than the 2nd, 4th to 6th subequal in length, longer than wide, weakly narrowed to the base, 7th as long as but a little thicker than the 6th, 8th rather shorter than the 7th, 9th scarcely longer than the 8th, 10th as long as the 7th, 7th to 10th progressively increasing their width, the apical joint half as long again as the preceding, scarcely wider than the latter, oval but with the inner margin almost linear and the apex acuminate.

Head slightly wider than long, transversely elevated between suprantennal rounded prominences and depressed just behind, with a short weak longitudinal carina at middle, surface roughly, closely and somewhat confluently punctured, Eyes of moderate size, not so strongly prominent. Temples short, a little shorter than the longitudinal radius of eyes, narrowed posteriorly.

Pronotum a fourth wider than head and a fifth narrower than elytra, transverse, widest just before middle, sides and base conjointly rounded nearly circularly and their margins finely bordered except the middle of base, and the immarginated apex slightly and plainly emarginated ; disc weakly convex, strongly and moderately closely punctured but somewhat finely and less closely so in the middle, where it is very shallowly depressed on both sides.

Elytra oblong-oval, more than twice as long as prothorax, distinctly striated and the strial punctures strongly impressed, the dorsal intervals nearly flat, the lateral ones weakly convex, and each with a sparse row of fine punctures.

Femora not strongly thickened and emarginated along lower margin before apex. Tibiae distinctly curved at the base, moderately thickened and parallel-sided on apical half. Tarsi weakly dilated in front legs.

Prothorax beneath strongly but sparsely punctured, mesothorax strongly and closely punctured. Abdomen less closely and less strongly punctured and the last sternite closely punctured.

Body length : 5.5 mm.

PAKISTAN : Holotype : ♂, Dumial between Punjab and Hindukush, 7-IX-1956. Collected from under stone near the stream in a meadow.

The present species appears to me to be near **L. formaneki** Schuster or **L. tibetana** Schuster, but the construction of the antennal segments is different and the femora are only obtusely angulate before the apical emargination along the lower margin.

MELOIDAE

KASZAB (1958) published his work, "Die Meloiden Afghanistans (Coleoptera)", basing upon a rich material chiefly from KLAPPERICH's collection, and described and recorded a series of species occurring in Afghanistan. Although the Meloid-beetles captured by the members of the Karakorum-Hindukush Expeditions of the Kyoto University are relatively numerous in number, as compared with beetles of other families, they represent only eight species.

Subfamily Lyttinae

Epicauta erythrocephala latelineolata Mulsant et Rey, 1858.
Mém. Acad. Lyon, 1858, p. 175.
AFGHANISTAN : Ishkashim, 3 ex., 25-VIII-1960, R. Yosii leg.
Distribution : Transcaspia, Turkestan, Afghanistan.

Lytta clematidis Pallas, 1782.
Icon. Ins., 1782, p. 95, t. E-f. 25.
AFGHANISTAN : Pagman, 7 ex., 14-VI-1960, R. Yosii leg.

Distribution: Turkmenia, Turkestan, Siberia.

KASZAB reported this species from the same locality.

Lytta badakschanica Kaszab, 1958.

Acta Zool. Acad. Sci. Hung., III, p. 259.

AFGHANISTAN: Mt. Noshaq, 3800 m. alt., 1 ♂, 18-VII-1960, R. Yosii leg.

Distribution: Afghanistan (Badakhshan).

Mylabris (Chalcabris) frolovi Germar, 1824

Ins. Spec. nov., 1824, p. 226, t. 40-f. 7.

AFGHANISTAN: Kabul, 1 ex., 17-VI-1960, R. Yosii leg.; Borak, 2 ex., 11-VII-1960, R. Yosii leg.; Borak, 1 ex., 12-VII-1960, R. Yosii leg.; Ishkashim, 3 ex., 29-VIII-1960, R. Yosii leg.

KASZAB divided this species into three subspecies, **frolovi** Germar from Turkestan, Pamir, Iran and Afghanistan (Badakshan, Katagan), **kuziniana** Kaszab (p. 262) from Afghanistan (Pagman Mts.) and **afghanica** Kaszab (p. 263) from Afghanistan (Nuristan, S. Badakshan), but the beetles before me are not enough to separate them into groups.

Mylabris (Eumylabris) posticalis Dokhtouroff, 1890

Horae Soc. Ent. Ross., XXIV, p. 136, t. 2-f. 1.

AFGHANISTAN: Kabul, 2 ex., 3-VII-1960, R. Yosii leg.: Borak, 7 ex., 8-VII-1960, R. Yosii leg.: Zebak, 7 ex., 12-VII-1960, R. Yosii leg.

PAKISTAN: Pemnan, 2 ex., 12-VII-1955; Mashe, 11 ex., 8-VII-1955.

Distribution: Turkestan, Dsungaria, Iran, Afghanistan, Pakistan.

The elytral pattern of this species is not so variable. Two specimens from Kabul belong to the typical form and others belong to ab. **pseudomaculata** Kaszab (p. 284, f. 119).

Mylabris (Eumylabris) subbrevicornis Kaszab, 1958

Acta Zool. Acad. Sci. Hung., III, p. 276.

AFGHANISTAN: Kabul, 1 ex., 17-VI-1960, R. Yosii leg.

Distribution: Afghanistan.

The above example belongs to ab. **transverseplagiata** Kaszab (p. 277, f. 85).

Mylabris (Corrizia) tekkensis (Heyden, 1883)

Deutsche Ent. Zeitschr., XXVII, p. 360 (*Zonabris*).

AFGHANISTAN: Borak, 8 ex., 9-VII-1960, R. Yosii leg.: Borak, 3 ex., 11-VII-1960, R. Yosii leg.; Zebak, 1 ex., 12-VII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

Mylabris sp.

AFGHANISTAN: Kandahar, 1 ex., 6-VI-1960, R. Yosii leg.

Distribution: Afghanistan.

The elytral maculation of this species resembles that of **M. (Neabris) klapperichi hirtipedes** ab. **fletcheri** Kaszab, but the tarsal claws have thin but long appendages.

ANTHICIDAE

The Anthicid material of the Kyoto University Hindukush Expeditions contains five species in 26 specimens.

Notoxus simulans Heberdey, 1935

in Visser Wiss. Ergebn. Niederl. Exped. Karakorum, I, 1935, p. 304, f. 1.

AFGHANISTAN: Borak, 1 ♀, 10-VII-1960, R. Yosii leg.

Distribution: Bosnia, Asia minor, S. Russia, Caucasus, Turkestan, Kirghisia, Afghanistan, Kashmir, Dsungaria, Mongolia, Transbaikal.

Notoxus hirtus Laferté-Senectère, 1848 (Fig. E)

Monogr. d. Anthicus, 1848, p. 28.

AFGHANISTAN: Pagman, 1 ♂, 17-VII-1960, R. Yosii leg.

Distribution: Central Asia, Transcaspia, Turkestan, Pamir, Siberia, Tibet.

The Afghanistan form somewhat differs from the typical race in the shape of the male genitalia, and may possibly represent a local subspecies.

Anthicus turkestanicus Pic, 1893

Rev. d'Ent., XII, p. 155.

AFGHANISTAN: Faizabad, 3 ex., 5/6-VII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

Anthicus steppensis Marseul, 1879

Monogr. d. Anthicides, 1879, p. 151.

AFGHANISTAN: Kotal-i-Bonarat, Badakhshan, 11 ex., 6-IX-1960, R. Yosii leg.

Distribution: Iran, Kirghisia, Afghanistan.

Anthicus hispidus Rossi, 1792

Mant., I, 1792, p. 46.

AFGHANISTAN: Faizabad, 2 ex., 6-VII-1960, R, Yosii leg.

Distribution: Palaearctic Region.

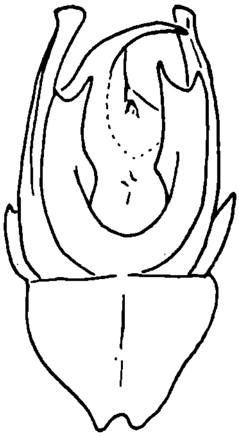

Fig. E Male genitalia of *Notoxus hirtus* Laf. from Pagman.

CERAMBYCIDAE

One male specimen of Prionine species is available for my study.

Subfamily Prioninae

Polyarthron (Pseudomonocladum) semenowi (Lameere, 1912)

Ann. Soc. Ent. Belg., LVI, p. 224. (*Prionus*).

IRAN: Passargadae, 1 ♂, 27-VIII-1956, S. Azuma leg.

Distribution: Iran.

The description of LAMEERE agrees fairly well with our specimen.

This species appears to be nearly related to **P. minutum** Pic from the same country, but the body is smaller, the coloration is lighter and the antennae are 24-jointed with their 3rd joint scarcely longer than the 1st.

BRUCHIDAE

Only two specimens of Bruchid-beetles are available for study. They belong apparently to one species and unfortunately are both females.

Euspermophagus canus (Baudi, 1886)

Deutsche Ent. Zeitschr., XXX, p. 108, 110.

AFGHANISTAN: Faizabad, 1 ex., 8-VII-1960, R. Yosii leg.; Borak, 1 ex., 9-VIII-1960, R. Yosii leg.

Distribution: Turkestan, Afghanistan.

(Partly aided by the Governmental Research Fund for Science from the Department of Education.)

Fleas (Siphonaptera) of Afghanistan

By

Kôhei SAKAGUTI *

During the Japanese Pamir Expedition, 1960 of the Academic Alpine Club of Kyoto, Prof. Riozo Yosii collected a small number of fleas from the body of a tarbagan, *Arctomys aureus* (Dufour), at the lake-side of lake Shewa (Shiwa), Badakhshan, north-eastern Afghanistan.

The flea-fauna of Afghanistan was studied by the authors of Jordan (1944), Peus (1957) and Smit (1960), and 18 species are known to occur in this district. Among those species there are included several interesting and endemic species such as *Nosopsyllus* (*Gerbillophilus*) *afghanus*, *Callopsylla alticola* and *Rhinolophopsylla unipectinata turkestanica.* Most of the materials reported by Smit ('60) were collected by Dr. Lindberg, famous Swedish student of fauna of Afghanistan. Nevertheless, as the fauna of this district, as Smit ('60) suggested, is very rich and varied judging from what is known about that of the neighbouring Soviet Republics, the number of 18 is assumed to be merely a small part of the total number that occur there.

The present report comprisses a few, hitherto unknown species as given below. Before going further, the author wishes to express his hearty thanks to Prof. R. Yosii who allowed him to study these valuable materials. The author also wishes to extend his cordial gratitude to Mr. F.G.A.M. Smit of the British Museum, Tring, who gave many helpful suggestions in this study.

Pulex irritans Linnaeus, 1758

1♀, Lake Shewa, 9. IX. 1960, from *Arctomys aureus*, coll. R. Yosii.

Well known human flea was already reported by Peus ('57) and Smit ('60) from Afghanistan on various localities at various altitudes. Although Smit recorded *Canis familiaris* (domesticated) as the host of this flea excepting the human host, it is noticeable that the present specimen was collected from tarbagan, *Arctomys aureus* (wild).

Citellophilus lebedewi (Wagner, 1932)

Figs. 1-3.

1♂, Lake Shewa, 9. IX. 1960, from *Arctomys aureus*, coll. R. Yosii.

This species is, apart from *menzbieri*, the only marmot-parasite in the genus

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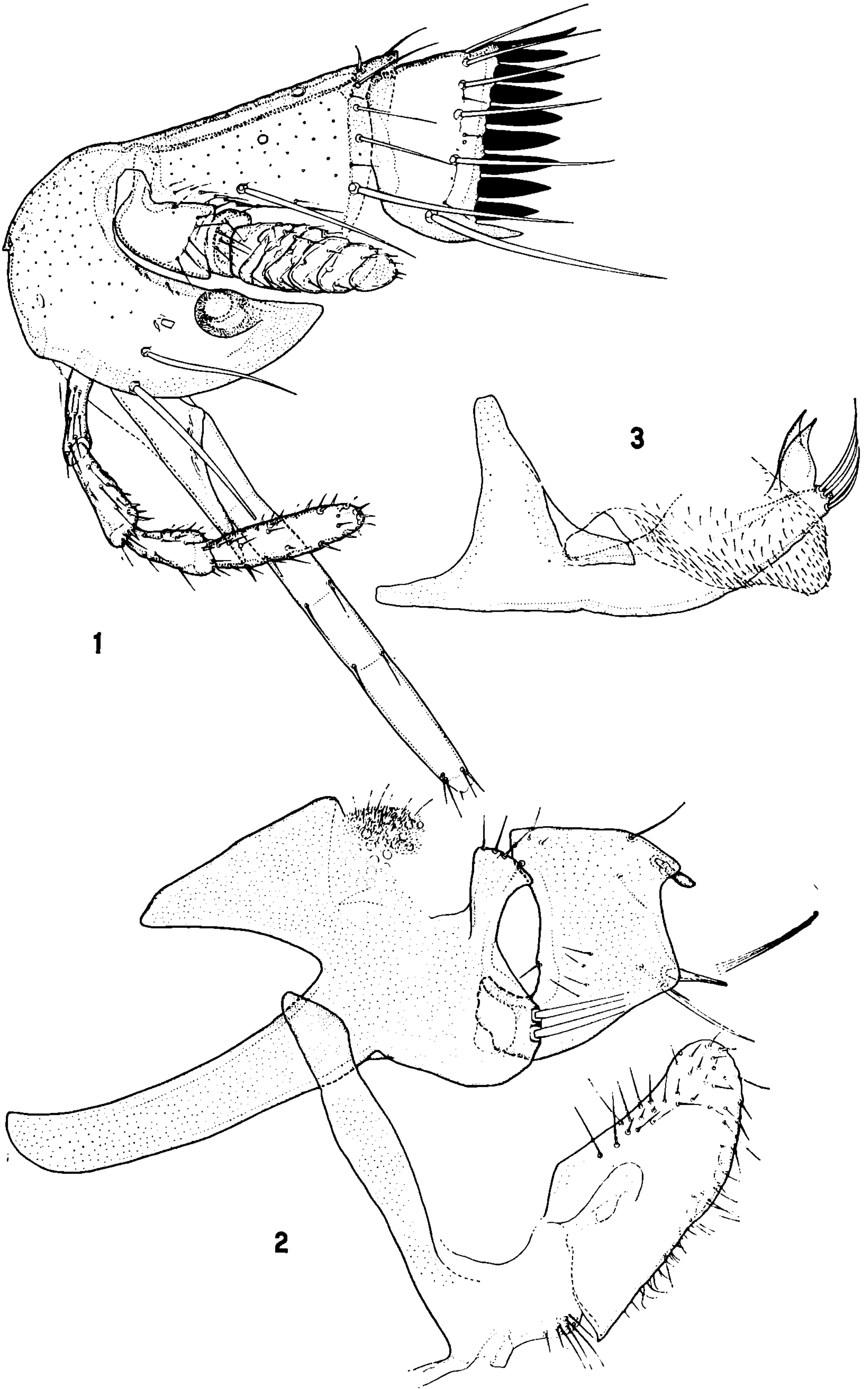


Figs. 1-3. *Citellophilus lebedewi* (Wagner), (from Lake Shewa, Badakhshan, Afghanistan).
1. Head and prothorax, ♂; 2. Clasper and sternite IX, ♂; 3. Sternite VIII, ♂.

of predominantly *Citellus* parasites. Wagner ('32) described this species based upon 2 ♀♀ collected from the marmot on Ala-Tau mountains (Sumirjetschensk). Argiropulo and Dubinin (1948) gave the description of male-sex and drew the figure of the genitalia from the materials collected from *Marmota caudata* on Fergane (Arslan-bob). Ioff and Scalon (1954) divided into two forms (*lebedewi lebedewi* and *l. princeps*) by the presence and the absence of a deep lateral sinus on the apical margin of sternite VII in female. The feature of male of Afghanistan is generally same as the figure of Argiropulo and Dubinin ('48), but differs in several aspects: both anterior and posterior angles of the fixed process of clasper are much acute, and therefor, the upper margin is not seemed rounded as drawn in the figure. The shape of movable finger is almost same as that of the figure, but the upper margin more straight, and the location of the rounded sinus on the posterior margin is much high. The shape of sternite VIII is similar to the figure. The sternite IX is different: its top more broad and rounded, the anterior half of the lower margin not concave and much convex as shown in fig. 2. This difference in the shape of sternite IX of male is rather prominent, and if the female specimen is obtained in future, it may indicate a subspecific differentiation.

This flea is known as characteristic parasite of marmots in Tyan-Shan (*Marmota caudata* and *M. baibacina*).

Oropsylla segregata Wagner, 1930

Figs. 4-7.

2♂♂, 1♀, Lake Shewa, 9. IX. 1960, from *Arctomys aureus*, coll. R. Yosii.

Oropsylla segregata was described from badger, *Meles* sp. of Pamir (as *Paraceras segregatus*). Unfortunately the male holotype of this species is in Leningrad, and thus, not readily available for comparison. Wagner ('30) did not draw the sternite VIII, IX, and crochet in his description, so we could not compare those structures. However, the shape of clasper and movable finger is closely alike Wagner's figure.

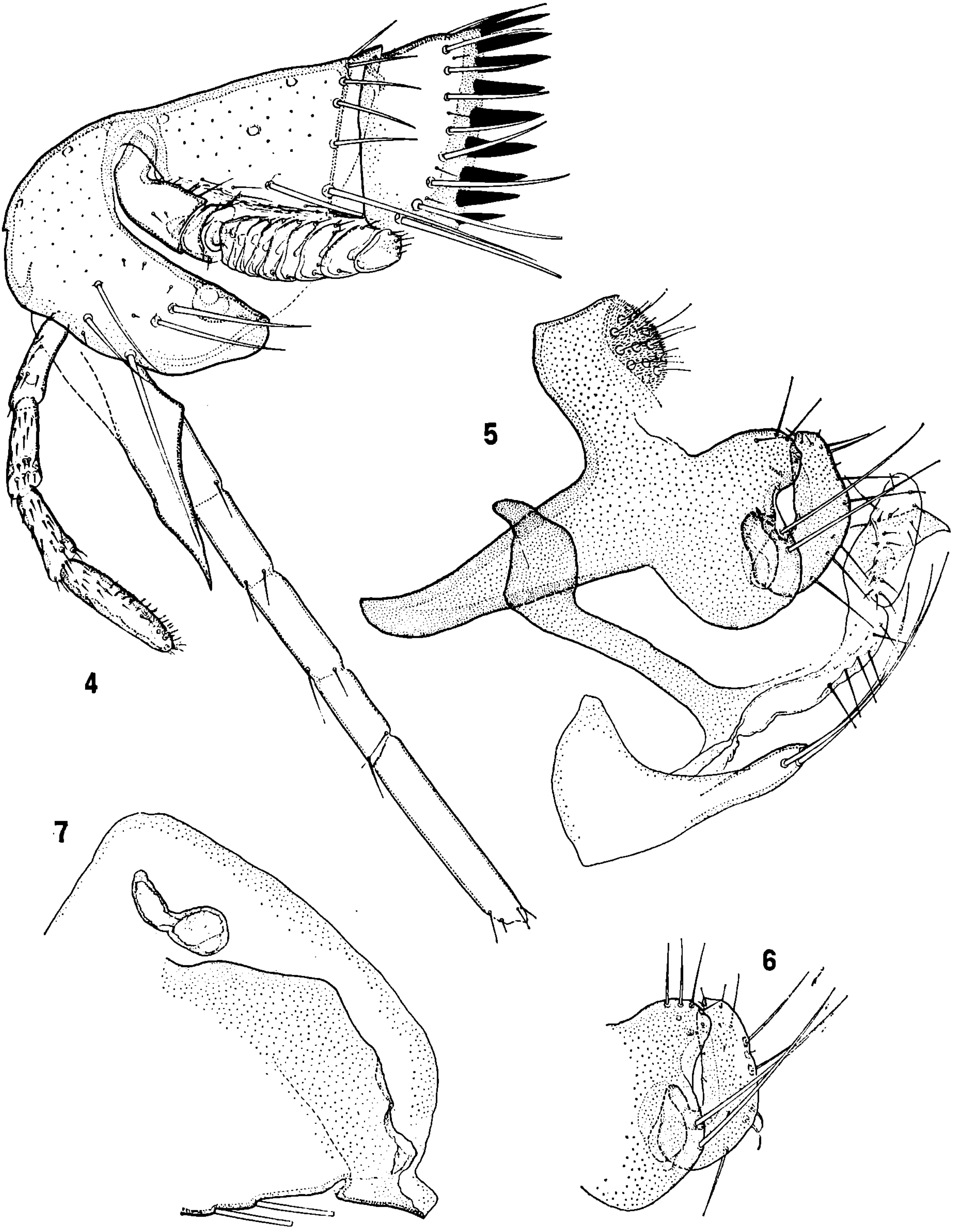
The representatives of the genus *Oropsylla* are mostly parasitic on marmots and susliks in Eurasia and North America. The present host, *Arctomys aureus*, is supposed to be the suitable host rather than the type-host (*Meles* sp.) recorded by Wagner.

Amphalius sp.

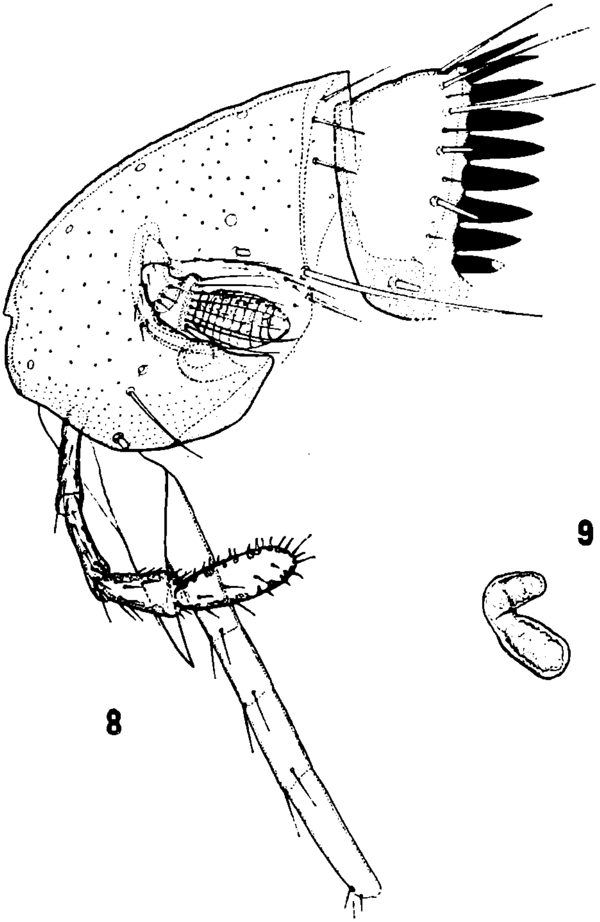
Figs. 8-9.

1♀, Lake Shewa, 9. IX. 1960, from *Arctomys aureus*, coll. R. Yosii.

Single female specimen was collected from *Arctomys aureus* mixed among the fore-going species of fleas. It is certainly quite different from the three known species of the genus. Anal stylet with a brush of many setae. But, as



Figs. 4–7. *Oropsylla segregata* Wagner, (from Lake Shewa, Badakhshan, Afghanistan). 4. Head and prothorax, ♂; 5. Clasper and sternite IX, ♂; 6. Clasper, ♂ (of another specimen); 7. Spermatheca and sternite VII, ♀.



Figs. 8-9. *Amphalius* sp., (from Lake Shewa, Badakhshan, Afghanistan).
8. Head and prothorax, ♀; 9. Spermatheca, ♀.

the specimen is too much damaged, it is impossible to decide the species.

All three known species of genus *Amphalius* mainly occur on pikas (*Ochotona*) in Asia and North America, and also on susliks, tarbagans and some other mammals.

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Some Species of the Aquatic Coleoptera from Afghanistan and Pakistan

By

Masataka SATÔ *

This short paper is based upon the material collected by Prof. Dr. R. YOSII of Kyoto University during the scientific expedition to Mt. Noshaq of Afghanistan in 1960. Although the collection is small, it is of great value, for the knowledge concerning the aquatic coleoptera of this district is much limited.

Before going further, I wish to express my cordial thanks to Prof. Dr. T. ISHIHARA of Ehime University and to Dr. S. UÉNO of the National Science Museum for their kind help in the course of the present work and to Prof. Dr. R. YOSII for the valuable material.

Dytiscidae

1. **Guignotus angularis** (KLUG)

Symb. Phys., 4, pl. 34, fs. 1, 2 (1834) (*Hydroporus*).

Specimens examined: 2 ♂♂, Bambur near Karachi, W. Pakistan, June 5, 1960.

Distribution: Arabia, Pakistan, Algeria, Tunisia, Egypt, Eritrea, Somaliland, Sudan.

2. **Potamonectes** (s. str.) **elegans** (PANZER)

Faun. Germ., 24, t. 5 (1794) (*Dytiscus*).

Specimens examined: 11 ♂♂, Kabul, Afghanistan, June 10 & 17, 1960; 1 ♂, Doab-by-Shewa, Afghanistan, Sept. 10, 1960.

Distribution: Europe, Afghanistan, Siberia, N. America.

3. **Agabus (Dichonectes) biguttatus** (OLIVIER)

Entom., 3: 26 (1795) (*Dytiscus*).

Specimen examined: 1 ♀, Kabul, Afghanistan, June 17, 1960,

Distribution: Europe, Turkestan, Afghanistan, Pakistan, Kashmir, N. Africa, Canary Is.

4. **Gaurodytes** (s. str.) **conspersus** (MARSHAM)

Entom. Brit., 1 : 427 (1832) (*Dytiscus*).

Specimens examined: 1 ♂, 1 ♀, Borak, Afghanistan, July 12, 1960; 1 ♂, 1 ♀, Ishkashim, Afghanistan, Sept. 2, 1960.

Distribution: Europe, Asia Minor, Afghanistan, S. Siberia, N. India, N. Africa.

5. **Cybister** (s. str.) **lateralimarginalis** (DEGEER)

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Present address: Aichi Institute of Public Health, Nagoya.

Mem. Hist. Nat. Ins., 4: 396 (1774) (*Dytiscus*).

Specimen examined: 1 ♂, Kabul, Afghanistan, June 17, 1960.

Distribution: Europe, Turkestan, W. Asia, Afghanistan, Tibet, Egypt.

Notes: The present specimen is slightly different from the European ones in the body form which is somewhat stouter, in the darker under surface and in the comparatively widened apex of penis.

Hydrophilidae

1. **Helophorus (Atracthelophorus)** sp.

Specimen examined: 1 ex., Mt. Noshaq (Alt. 3800 m), Afghanistan, July 25, 1960.

Notes: Unless more specimens are obtained, I cannot decide the specific name with certainty, though the species is allied to *H. frater* D'ORCHYMONT.

2. **Helochares (Hydrobaticus)** sp.

Specimen examined: 1 ♀, Bambur near Karachi, W. Pakistan, June 5, 1960.

Notes: The specimen before me is a single female near *H.* (*H.*) *neglectus* (HOPE). It is extremely difficult to identify the members of the genus *Helochares*, even if specimens at hand are good, and I cannot determine the species now based upon a female specimen only.

3. **Regimbartia attenuata** (FABRICIUS)

Syst. Eleuth., 1: 53 (1801) (*Hydrophilus*).

Specimens examined: 1 ex., Ishkashim, Afghanistan, Aug. 30, 1960; 2 exs., Thatta, W. Pakistan, June 2, 1960.

Distribution: Arabia, Afghanistan, W. Pakistan, India, Ceylon, Burma, Malaya, Indo-china, S. China, Sunda Is., Sumatra, Philippines, Formosa, Japan, N. Australia.

Coleoptera Staphylinidae of Afghanistan and W. Pakistan

By

Kôhei SAWADA

Fam. Staphylinidae
Subfam. Oxytelinae
Tribe Omaliini

1. **Hapalaraea (Phyllodrepa) lestevoides** sp. n.

Moderately shining, dark brown, antennae, palpi and legs including the coxae yellowish brown, finely moderately densely pubescent throughout. Length 5.4 mm.

In general appearance very similar to a *Lesteva*. Readily distinguished from *H. salicis* (Gyll.) by the much more elongate antennae and the different sculpture of the elytra, etc. Head considerably narrower than the pronotum, before the ocelli with a short sulcus on either side, clypeal region depressed, nearly impunctate and shining, the rest of the surface moderately coarsely, rather sparingly punctured, eyes relatively large and prominent, their diameter greater than the narrowly rounded post-ocular space (3 : 1).

Antennae quite slender, all the joints much longer than broad, with the 3rd joint longer than 2nd (1.4 : 1), 4th slightly shorter than 3rd, 5th to 10th each equal in size, 11th elongate, parallel-sided, nearly reaching the middle of 8th. Pronotum cordiform (Fig. 1), enlarged and very broadly rounded in front, suddenly contracted behind, before the flat, rectangular posterior angles with a slight sinus, the sides completely finely margined, with an obsolete round concave on either side of the middle line and with an additional depression on the middle of the base, moderately coarsely, rather densely, uniformly punctured, the interstice quite even, without ground-sculpture. Elytra fully twice as long as the pronotum, rather strongly widened behind, closely, more coarsely punctured than the pronotum, the interstice somewhat uneven but devoid of the ground-sculpture. Abdomen closely, very finely, submuricately punctulate and distinctly alutaceous, with moderately fine, longer pubescence formed an obsolete tomentum on either side of the middle in the visible four tergites.

Holo (♀)- and paratypes : 2 ex. Mt. Noshaq, 3,800 m. above the sea, 25 VII 1960, Dr. R. Yosii leg.

Tribe Oxytelini

2. **Carpelimus (Troginus) exiguus** (Erichson)

Trogophloeus exiguus Erichson, 1839, Käf. MK. Brandenb., p. 604.

Specimen examined : 1 ex., Thatta near Karachi W. Pakistan 2 VI 1960, Dr. R. Yosii leg.

Distribution : Palearctic Region and Africa.

3. **Bledius** (*Astycops*) **tibialis** Heer

Bledius tibialis Heer, 1838-42, Fn. Helv., I, p. 212.

Specimen examined : 1 ♀, Pagman, 10 VI 1960, Dr. R. Yosii leg.

Distribution : Cantral and Southern Europe and Caucasus.

Subfam. Steninae

4. **Stenus** (*s. str.*) **ater** Mannerheim

Stenus ater Mannerheim, 1830, Brachélytres..., Mem. Acad. Sci. St. Petersbourg, vol. I, p. 42.

Specimens examined : 2 ♂, 1 ♀, Faizabad, 6 VII 1960, Dr. R. Yosii leg., 1 ♂, Karezmyl, 18 VI 1960, Dr. R. Yosii leg.

Distribution : Palearctic Region.

Subfam. Paederinae

Tribe Paederini

5. **Astenus** (*s. str.*) **simlaensis** Cameron

Astenus simlaensis Cameron, 1931, Fn. Brit. India, Col. Staph., II, p. 74, f. 20.

Specimens examined : 1 ♀, 1 ♂, Faizabad. 6-8 VII 1960, Dr. R. Yosii leg.

Distribution : East India.

6. **Paederus** (*s. str.*) **fuscipes** Curtis var. *peregrinus* Erichson

Paederus fuscipes Curtis, 1823-40, Ent. Brit., III, p. 108.

Paederus riparius Gravenhorst var. *peregrinus* Erichson, 1839-40, Gen. spec. Staph., p. 656.

Specimens examined : 4 ♂, 2 ♀, Borak, 10-11 VII 1960, Dr. R. Yosii leg., 1 ♀, Faizabad, 6 VII 1960 Dr. R. Yosii leg., 1 ♀, Thatta, W. Pakistan 2 VI 1960, Dr. R. Yosii leg., 2 ♀, Ishkashim, 30 VIII 1960, Dr. R. Yosii leg.

Distribution : Warmer part of the world except America.

7. **Paederus** (*s. str.*) **tamulus** Erichson

Paederus tamulus Erichson, 1839-40, Gen. spec. Staph., p. 661.

Specimen examined : 1 ♂, Pagman, 10 VI 1960, Dr. R. Yosii leg.

Distribution : India, Burma, Ceylon, Greater Sunda Is., China and South Japan.

8. **Scopaeus** (*s. str.*) **laevigatus** Gyllenhal

Scopaeus laevigatus Gyllenhal, 1827, Ins. Suec., IV, p. 483.

Specimens examined : 1 ♂, 1 ♀, Faizabad, 6 VII 1960, Dr. R. Yosii leg.

Distribution : Europe and Mediterranean region.

Subfam. Staphylininae

Tribe Staphylinini

9. **Philonthus** (*s. str.*) **atratus** (Gravenhorst)

Staphylinus atratus Gravenhorst, 1802, Col. Micr. Brunsv., p. 170.

Specimens examined : 2 ♀, Kotal-i-Bondarat, Darwaz, 6 IX 1960, Dr. R. Yosii leg.

Distribution : Palearctic Region and North America.

10. **Philonthus** (*s. str.*) **debilis** (Gravenhorst)
Staphylinus debilis Gravenhorst, 1802, Col. Micr. Brunsv., p. 35.
Specimens examined: 1 ♂, 1 ♀, Kabul, 20 VI 1960, Dr. R. Yosii leg.
Distribution: Palearctic Region and North America.

11. **Philonthus** (*s. str.*) **rotundicollis** (Ménetr.)
Staphylinus rotundicollis Ménetr., 1832, Cat. rais. Zool., p. 145.
Specimen examined: 1 ♀, Kotal-i-Bondarat, 6 IX 1960, Dr. R. Yosii leg.
Distribution: Palearctic Region and northern part of Oriental Region.

12. **Philonthus** (*s. str.*) **concinnus** (Gravenhorst)
Staphylinus concinnus Gravenhorst, 1802, Col. Micr. Brunsv., p. 21.
Specimen examined: 1 ♀, Faizabad, 6 VII 1960, Dr. R. Yosii leg.
Distribution: Palearctic Region, Atlantic and Pacific Coasts of North America and Canada.

13. **Abemus** sp.
(group of *chloropterus* Panz.)
Specimen examined: 1 ♂, Borak, 10 VII 1960, Dr. R. Yosii leg.

Subfam. Tachyporinae

Tribe Tachyporini

14. **Tachyporus hypnorum** (Fabricius)
Staphylinus hypnorum Fabricius, 1775, Syst. Ent., p. 266.
Specimens examined: 1 ♂, 4 ♀, Faizabad, 6 VII 1960, Dr. R. Yosii leg.
Distribution: Palearctic Region and Northeast India.

15. **Tachyporus nitidulus** (Fabricius)
Staphylinus nitidulus Fabricius, 1781, Spec. Inc. I, p. 337.
Specimens examined: 2 ♂, Taiwarra, 3 IX 1955, Umesao leg.
Distribution: Palearctic and Nearctic Regions.

16. **Tachyporus cuneus** Luze ?
Tachyporus cuneus Luze, 1901, Verh. zool--bot. Ges. Wien, LI, p. 175.
Specimen examined: 1 ♀, Ishkashim, 30 VIII 1960.
Distribution: Central Asia.

17. **Tachinus** (*s. str.*) **afghanicus** sp. n.

Build of *laticollis* Grav., but narrower, differently punctured and with more elongate antennae, etc.

Rather narrow, the fore-parts nearly glabrous, very shining and without ground-sculpture, blackish, elytra more or less reddish brown, antennae brown, with the first four joints pitchy. Length 3.5 (♂) – 4.3 (♀) mm.

The head is very finely, rather sparingly punctulate, the eyes moderate, not so prominent as in *laticollis* G. Antennae with the 3rd joint nearly twice as long as 2nd, 4th as long as 2nd, 5th to 10th all distinctly longer than broad, gradually decreasing in length. Pronotum transverse (1 : 1.5), minutely punctulate as on the head. Elytra evidently longer than the pronotum (1 : 1.7), slightly widened behind, moderately densely punctured, the puncture is much larger than that of the pronotum. Abdomen not strongly narrowed behind, more finely but as closely punctured as the pronotum, at the bases of all tergites bearing a fine ground-sculpture, with shorter, golden, not very close pubescence.

♂, antepenultimate sternite simple, penultimate sternite broadly, rather deeply arcuately emarginate, the extremities of the emargination obtuse and borderd with about 6 fringing spinules, the bottom of the emargination inconspicuously granulate, terminal tergite with 4 acute lobes (Fig. 2), median lobes slightly more posterior, protibiae normally dilated distally, protarsi about as long as protibiae.

♀, terminal tergite with 4 very long lobes (Fig. 3) the median lobes spiniform, about as long as the lateral lobes, 6th sternite with 6 processes, the median pair broader, produced beyond the apex of the antelateral lobes and separated by a subparallel-sided excision, the apex of each with about 6 brown spinules.

Holo (♂)- and allotypes: Mt. Noshaq 3,800 m. above the sea, 20 VII 1960, Dr. R. Yosii leg.

Subfam. Aleocharinae
Tribe Myrmedoniini

18. **Falagria** (*Anaulacaspis*) **yosii** sp. n.

Strongly shining, reddish brown, the head and abdomen with the 4th and 5th visible tergites somewhat brown, antennae and legs brownish yellow. Length 2.85 mm.

In colour and build approaches *thoracica* Curt. But at once recognized by the more slender antennae, the 4th joint of which are apparently longer than broad, sides of the pronotum more dilated in front, more strongly contracted behind, etc. Head as long as broad, suborbicular, relatively slightly convex, a little narrower than the pronotum, the posterior angles entirely broadly rounded, with an obsolete median impression between the antennae, the surface scarcely perceptibly, sparingly punctulate. Antennae with the 3rd joint as long as 2nd, 4th to 8th slightly longer than broad, 9th and 10th about as long as broad, very gradually increasing in width, 11th shorter than the two precedings together. Pronotum fully as long as broad, the sides distinctly rounded and dilated in front, sinuately retracted behind (Fig. 4), the posterior angles rectangular, flat, with the well-developed median sulcus deeper and wider behind, minutely and sparingly punctulate at the sides, more closely on the disc. Scutellum obsoletely but densely granulate. Elytra slightly longer (1 : 1.2) and distinctly broader (1 : 1.4) than the pronotum, around the scutellum closely but finely granulate as in *thoracica*. Abdomen with a row of several fine punctures in the basal impressions, elsewhere moderately densely, finely punctulate. Legs slender.

Holotype: 1 ♂, Faizabad, 6 VII 1960, Dr. R. Yosii leg.

19. **Falagria** (*s. str.*) **sulcatula** (Gravenhorst)
Aleochara sulcatula Gravenhorst, 1806, Mon. Col. Micr., p. 151.
Specimens examined: 5 ex., Taiwarra, 3 IX 1955, Umesao leg.
Distribution: Western Zone of Palearctic Region.

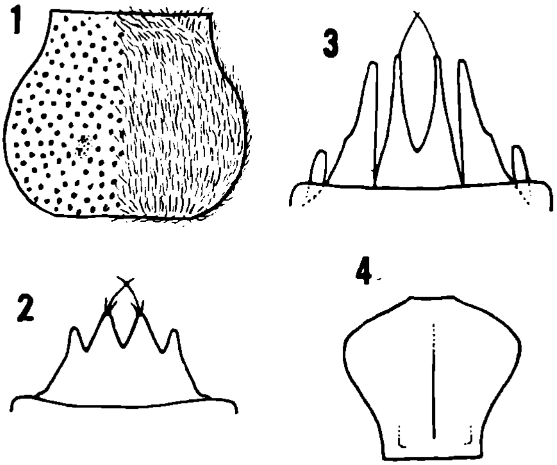
20. **Ischnopoda** sp.
Specimen examined: 1 ex., Mt. Noshaq, 20 VII 1960, Dr. R. Yosii leg.

21. **Ischnopoda** (*Atheta*) **spelaeophila** (Scheerpeltz)
Atheta (*Atheta*) **spelaeophila** Scheerpeltz, 1963, Lunds Univ. Ars. 58 (II), p. 30.
Specimen examined: 1 ex., Mt. Noshaq, 3,800 m. alt., 20 VII 1960, Dr. R. Yosii leg.
Distribution: Afghanistan.

22. **Ischnopoda** sp.
Specimens examined: 2 ex., Taiwarra, 3 IX 1955, T. Umesao leg.

23. **Crataraea** sp.
Specimen examined: 3 ex., Nt. Noshaq, 20 VII 1960, Dr. R. Yosii leg.
Species No. 20 to No. 23 are unfortunately in bad conditions for exact determination.

24. **Aleochara (Coprochara) bipustulata** (Linné)
Staphylinus bipustulatus Linné, 1761, Fn. Suec., p. 232.



Explanation of figures

1. Pronotum of *Hapalaraea (Phyllodrepa) lestevoides* sp. n.
2. Male terminal tergite of *Tachinus (s. str.) afghanicus* sp. n.
3. Female terminal tergite of *Tachinus (s. str.) afghanicus* sp. n.
4. Pronotum of *Falagria (Anaulacaspis) yosii* sp. n.

Specimen exmined : 1 ex., Pagman, 17 VI 1960, Dr. R. Yosii leg.

Distribution : Palearctic and Nearctic Regions, Africa.

25. **Aleochara (Coprochara) verna** Say

Aleochara verna Say, 1836, Trans. Amer. Philos. Soc., vol. VI, p. 156.

Specimen examined : 1 ex., Mt. Noshaq 3,800 m. alt., 20 VII 1960, Dr. R. Yosii leg.

Distribution : Europe and North America.

Acknowledgements

I greatly wish to thank Dr. R. Yosii for his generous aid on meterial. I am also much indebted to Dr. T. Nakane for his constant guidance in various points.

Some Aphididae from Afghanistan (Homoptera)

By

† Ryoichi TAKAHASHI

Our present knowledge of the aphid fauna of Afghanistan is very far from complete. In 1889 BUCKTON described a species under the name of *Pemphigus coccus* BUCKTON (Trans. Linn. Soc., V, pp. 141-142), and in 1941 GHULA MULLAH listed 13 species of these insects (Indian Jl. Ent., III, pp. 225-238). So far as I have been able to learn, these are the only records of the aphids of Afghanistan.

I express here my thanks to Prof. R. YOSII for the opportunity of examining specimens collected in his expedition to Afghanistan. I am also greatly indebted to Dr. V. F. EASTOP of the British Museum for his help in identifying the species here dealt with, and for the privilege of studying an aphid from Pakistan.

Brachycaudus cardui yosiii n. subsp.

Apterous viviparous female: Head dark on dorsum, but pale along posterior half of eye, blackish on frontal area; lst antennal segment blackish, 2nd pale brownish, 3rd pale, pale brownish at apex; 4th pale, darker at apex; 5th dark; pronotum black, mesonotum with a broad black band, metanotum with a smaller black hand which is destinctly apart from mesonotum and abdomen; abdomen black and sclerotized over dorsum except around bases of cornicles; cornicles and cauda black; coxae and femora black; tibiae pale, dark at apex (in cleared specimens). Body oval, about 1,5-1,6 times as long as wide in specimens mounted in balsam; lst-6th abdominal tergites smooth, fused together, with a very faint trace of division between 5th and 6th; 7th and 8th tergites separated with spinules; spinal tubercles absent. Head rounded on median area of front, with normal chaetotaxy; dorsal setae pointed, about 1,2-1,5 times as long as middle diameter of 3rd antennal segment. Frontal tubercles absent; 2-3 setae present at lateral part of front of head near antenna. Antennae slightly longer than half length of body; lst segment with 5 setae, 2nd a little imbricated, with 4 setae; 3rd a little narrowed gradually at base, imbricated, wanting sensoria, with a few pointed setae which are 0, 6-0, 7 times as long as middle diameter of the segment; relative length of segments about as follows, III-23, IV-12, V-8, VI-6 + 20~23. Clypeus with 2 pairs of anterior setae; mandibular laminae with 3 setae; rostrum reaching hind coxae; ultimate segment longer than penultimate, over 4 times as long as wide at mid-length, straight or slightly concave at lateral margin, about 1,8–1,9 times as long as 2nd segment of hind tarsus, with 6–8 secondary setae, about 2.5 times as long as basal part of 6th antennal segment. Cornicles short, distinctly shorter than 3rd antennal segment, slightly shorter than half width of head across eyes, about 3,8–4,0 times as long as wide at middle, gradually tapering, about one tenth of body length, at least twice as long as cauda, with minute spinules in rows, but almost smooth on apical part, with one or two striates at apex, with a distinct flange, at apex excluding flange slightly broader than middle diameter of hind tibia. Cauda tongue-shaped, a little or slightly broader than long, with 3 pairs of marginal setae. Genital plate blackish, with about 28 setae along hind margin and 6 anterior setae. Femora imbricated on distal part. with some setae which are as long as half diameter of middle part of femur; tibiae smooth, tibial setae a little or slightly shorter than middle diameter of tibia; tarsi with 3 setae on lst segment, 2nd segment of hind tarsus with 2 upper and 4 lower secondary setae. Pronotum with 6 setae and a large, low marginal tubercle; mesonotum with 12–14 setae; 2nd–4th abdominal segments with a large flat marginal tubercle, which is sometimes nearly as large as spiracular aperture; and with 6 dorsal setae and a marginal setae, these setae nearly as long as those on head; 6th abdominal segment with a large marginal sclerite behind cornicle, which is separated from dorsal sclerite; and 4 dorsal setae between cornicles; 7th segment with 4 dorsal setae which are twice as long as middle diameter of 3rd antennal segment; 8th with setae which are about 3,0–3,5 times as long as middle diameter of 3rd antennal segment. Spiracles on rather large dark sclerites, which are fused with marginal or dorsal sclerites on 6th and 7th abdominal segments; spiracular apertures subcircular; basal 2 abdominal spiracles distinctly. Mesosternum with a pair of rounded blunt dark tubercles on median area along anterior margin, which are on a dark sclerite and with spinules. Body 2,2–2,3 mm.

Host: *Artemisia* sp.

Many *apterae* (Syntypes) taken at Shewa Plateau (10. IX. 1960; R. YOSHII leg.)

A few *apterae* of this aphid collected at Murree, Pakistan (3. IX. 1960; 26. VIII. 1960; Dr. M. A. AHANI leg.) have been examined through the courtesy of Dr. V. F. EASTOP; they are larger in size, measuring 2,5 mm. in body length, with more setae on genital plate and on dorsum of abdomen; and with smaller marginal tubercles on pronotum.

This subspecies is different from the main species of Europe as follows: Setae on 3rd antennal segment longer. Processus terminalis as long as, or shorter than, 3rd antennal segment. Cornicles shorter. much shorter than 3rd antennal segment. Ultimate segment of rostrum longer as compared with 2nd segment of hind tarsus.

Alate viviparous female: Head, antennae and thorax black; abdomen blackish on dorsum of 3rd-8th segments; marginal sclerites of abdomen fused with dorsal sclerite on 5th and 6th segments. Dorsal setae of head subequal in length to middle diameter of 3rd antennal segment. Antennae about 3/4 of body length, 3rd segment with 18-22 sensoria scattered along whole length, 4th with a sensorium in a specimen; relative length of segments about as follows: III-25, IV-17, V-10, VI-6,5+30. Ultimate segment of rostrum slender, about 1,8 times to twice as long as basal part of 6th antennal segment, with 2 pairs of secondary setae one each surface. Genital plate with about 20 setae along hind margin and over 10 setae in an anterior cluster. Hind tarsi 2 or 3 setae on lst segment. Body 2,0 mm. in length. Other characters similar to *aptera*.

Described from 3 alatae taken by Dr. M. A. AHANI at Murree, Pakistan (30. VI. 1960), which are preserved in the British Museum.

Hyalopterus pruni amygdali BLANCHARD

Some *apterae* and *alatae* taken on *Phragmites*, at Kabul (21. VI. 1960; R. Yosii leg.).

Alatae differ from the main species in the absence of a dusky dorsal sclerite on the 7th and 8th abdominal segments; the cauda pale, not dusky; and in the fewer sensoria (17-14) on the 3rd antennal segment.

Hyalopterus arundiniformis GHULA MULLAH (Indian Jl. Ent., III, 1941, p. 225) recorded from Afghanistan may be the same thing, becoming a synonym.

Chaitophorus pseudotremulae GHULA MULLAH

Indian Jl. Ent., III, p. 231 (1941).

Apterous viviparous female; When cleared, body brownish, somewhat darker on submarginal area of dorsum of abdomen and across 3rd-6th tergites each; antennae blackish on basal and distal segments, pale on 3rd, pale or darker distally on 4th; coxae and femora black; tibiae black on both ends, hind tibiae almost black in some individuals; cornicles dark, cauda and anal plate pale. Body 1,5-1,6 times as long as wide when mounted in balsam, lst-6th abdominal segments fused together; without spinules and granules on dorsum of thorax and abdomen except on 8th tergite; dorsal setae very stout, expanded and almost truncated or bifid at apex. Head a little imbricated on lateral parts mesad of eyes on dorsum and venter, with 16-18 setae on dorsum and on venter; dorsal setae variable in size, longest ones 2,5 times as long as middle diameter of 3rd antennal segment and about twice as long as shortest setae on head. Frontal tubercles very short. Antennae over two-thirds of body length; lst segment with 7-8 blunt setae; 2nd with 4-5 similar ones, smooth; 3rd imbricated, without sensoria, with about 18-21 setae which are blunt or slightly capitate, longer setae slightly longer than middle diameter of the segment, about twice as long as shortest ones on the segment; setae along outside of the segment usually shorter, processus terminalis about 1,8-1,9 times as long as basal part, much shorter than 3rd; relative length of segments about as follows: III-21, IV-11, V-11, VI-7+13. Clypeus with 2 anterior setae; mandibular lamina with 7 or 8 setae, ultimate segment of rostrum reaching hind coxae, sometimes much beyond them, long slightly concave at lateral margin, over 5 times as long as wide at middle, 1,5 times as long as 2nd segment of hind tarsus, with 8 secondary setae longer than punultimate segment of rostrum, about 1,7 times as long as basal part of 6th antennal segment. Cornicles longer than wide at middle, reticulated, striated on basal part, fused basally with marginal sclerite on 6th abdominal segment, at apex as wide as, or narrower than globular part of cauda. Cauda distinctly constricted and globular on distal part, with 7 setae. Anal plate not indented. Genital plate brownish, with over 15 setae along hind margin, over 10 setae in an irregular row, and 4 longer anterior setae, Trochanters distinct, femora imbricated, with some blunt setae mostly on upper side, longest ones of which are half, or a little over half, as long as diameter of middle part of femur; tibiae without spinules, with many long, pointed setae and some blunt setae; longer ones 2,0-2,6 times as long as middle diameter of hind tibia; hind tibiae with 4-9 sensoria widely scattered on middle part or on distal half; lst tarsal segment with usually 5, sometimes 6 setae; 2nd segment of hind tarsus with 3 long, fine upper secondary setae, and 2 pairs of similar lower ones; lower pair of apical primary setae stouter, distinctly removed from apex; empodial setae long, normal; tarsi without spinules. Pronotum dark, with about 20 setae, mesonotum a little longer than head; metanotum short, defined from abdomen; abdomen smooth on lst-7th segments, not reticulated, with about 10 dorsal setae in a row and 3 marginal ones on each side, on 4th and 5th segments each; 8-10 setae between cornicles and 4-7 setae along hind margin on 6th; 3-7 dorsal setae on 7th; these setae similar to those on head; 8 much longer pointed setae in a row on 8th, which are over 5 times as long as middle diameter of 3rd antennal segment; in some specimens marginal sclerites distinct on 2nd-7th segments, which are smaller on anterior segments. Spiracular sclerites dark. Body 1,8 mm. long.

Alate viviparous female: Head with setae similar to *aptera*, some of which are blunt at apex. Antennae broken in a specimen now at hand. Ultimate segment of rostrum similar to *aptera*. Tibiae with long fine setae and long blunt ones, which are 1,2-1,8 times as long as middle diameter of hind tibia; hind tibiae black, with 3 sensoria on distal half. Abdomen with a black band and a marginal sclerite on lst-6th segments, sclerotized and black on 7th and 8th; marginal sclerites with spinules and mostly with 4 setae, but with 5 setae and fused with cornicles on 6th segment; dorsal sclerites smooth, distinctly isolated from each other; dorsal setae expanded and bifid or blunt at apex on lst-7th segments, about 8 on dorsal sclerite on 4th and 5th segments, 7 on 6th between cornicles; 8 on 7th; much longer, flagellate and 10 on 8th. Wings hyaline, not infuscated, broken. Body 1,9 mm.

Host plant: *Populus alba.*

Many *apterae* and an *alata* (1. VI. 1960, R. Yosii leg., at Kabul).

Related to *Chaitophorus populeti* PANZER, differing, however, as follows: *Aptera*: Body smaller, much less sclerotized on dorsum, not black. Dorsal setae fewer on head and pronotum. Antennae with much shorter blunt setae, processus terminalis somewhat shorter. Ultimate segment of rostrum about 1,5 times as long as 2nd segment of hind tarsus. Femora with much shorter blunt setae. Anal plate pale.

Afghanaphis new genus

In the type species, only the nymph is known, but the structures of wax-plates are very distinctive and a new genus is proposed. This genus is closely related to *Eriosoma* LEACH, but differs as follows: Wax-plates small, polygonal, numerous, densely crowded in large clusters; these clusters not well defined, without border line, 4 on pronotum and on basal abdominal segments, but a large contiguous cluster present across each posterior segment; also present on posterior part of venter. Cornicles distinctly elevated.

Genotype: *Afghanaphis ulmi* n. sp.

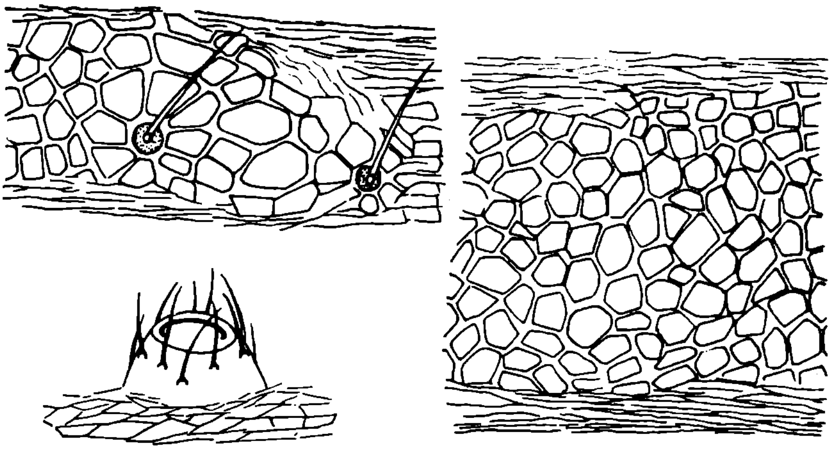
Afghanaphis (n. g.) **ulmi** n. sp.

Grown nymph of *alate viviparous female*: Body about twice as long as wide, membraneous on derm, pale and with pale wing pads when cleared, with much wax. Head pale brownish widely on median part of dorsum except on hind part, which area is with a large transverse cluster of fine reticulations (or wax-plates) on posterior part, divided and extending to venter beyond front; dorsal setae about 12, about one-third to half as long as diameter of 3rd antennal segment, 6-8 similar setae on each side of venter. Eyes of 3 facets. Antennae a little longer than one-third of body length, slightly less than twice as long as width of head across eyes, 6-segmented, lst segment pale brown, with 4 setae; 2nd as long as lst, as long as wide, narrowed to base, with 4 setae; 3rd stouter than tibia, smooth, with a few setae which are about one-third as long as diameter of the segment; 4th twice as long as wide; 5th and 6th with spinules in rows; primary sensoria transversely narrowed, without ciliae; processus terminalis very short, stout, rounded at apex, with 5 setae; relative length of segment about as follows; III-22∼25, IV-7∼8, V-7,5∼8, VI-7∼7,5. Clypeus with a pair of anterior setae; mandibular laminea not defined, with 3-4 setae; ultimate segment of rostrum reaching middle coxae, much longer than penultimate, brownish, smooth, over 4 times as long as wide at middle, about 1,3-1,4 times as long as 2nd segment of hind tarsus, much longer than 4th antennal segment, with 5 pairs of secondary setae; a pair of primary setae removed anteriorly. Cornicles distinctly elevated, with 8–12 scattered long setae, without distinct markings, without distinct flange, at middle part of 5th abdominal segment, at apex longer in diameter than middle part of hind tibia, the setae longer, or shorter, than diameter at apex.; Anal plate with about 10 setae. Caudal segment short. with 2 or 3 setae. Legs pale, trochanters faintly defined, femora sparsely with many setae, longest ones of which are about 1/2 of middle diameter of femur; tibiae smooth, hind tibiae longer than half length of antenna, with fine setae which are mostly shorter than middle diameter of tibia, but longest setae as long as that diameter; tarsi smooth, with 3, 3, 2 setae on lst segments; 2nd segment of hind tarsus slightly broadened basally, with 2 upper secondary setae and 2 pairs of lower ones; primary setae short, normal; hind tarsi slightly longer than fore and middle ones. Abdomen with about 10 setae including marginal ones in a row on lst–6th segments, 5 setae on 7th, 6 setae on 8th, these setae about one-third to two-thirds as long as middle diameter of 3rd antennal segment. Spiracles with pale brown sclerites, normal. Mesosternal furca with a very short, indistinct basal stem. Wax-plates small, polygonal, numerous, densely crowded in large clusters, these clusters not well defined, without border line; pronotum with a pair of large spinal clusters and a marginal one on each side; meso- and metanota with a pair of smaller subcircular spinal ones; basal 2 abdominal segments with a pair of large transverse spinal clusters very closely placed and a marginal one on each side; 3rd and following segments with a very large transverse contiguous cluster across each segment along row of setae, which is reaching margin, broader and about 10 plates wide on posterior segments; derm with fine linear markings or reticulations between and around these clusters. Abdomen with clusters of waxplates also on 5th and 6th sternites, but these plates not distinctly discernible on head. Body 2,5 mm.

Host: *Ulmus* sp., gall on the leaf.

Many nymphs, 26. VI. 1960, Kabul, Afghanistan, R. YOSII leg.

Adult *Alatae* were not found in the collection, but sensoria of antennae of adult stage can be observed under the skin of grown nymph; they are annular, 28–30 on 3rd segment, 6–8 on 4th, 5 or 6 on 5th, none secondary ones on 6th.



Afghanaphis ulmi n. g. n. sp.

Grown nymph of *alata.*

1. Part of smaller cluster of wax-plates.
2. Part of large cluster of wax-plates.
3. Cornicle.

On a Vole and a Mouse Collected from Mt. Noshaq by Prof. R. Yosii

By

Mitosi TOKUDA*

An immature specimen of vole shows definite characteristics of *Microtus arvalis*, although its size is far inferior to ordinary specimens of European representatives. The skull is perfectly *arvalis*-type, having smooth surface and scarcely specialized feature. The lower molar has a characteristic anterior loop which is provided with an internal and an exteral projection of nearly equal size. (Fig. 2)

M. arvalis is a common vole in continental Europe, distributing eastwardly North-west Mongolia and North-west China in north. It is quite natural that species distributes in south from southern Europe to Asia through mountain ranges of northern Afghanistan. The species is frequently subdivided into several subspecies owing to the minor difference of external dimensions and local

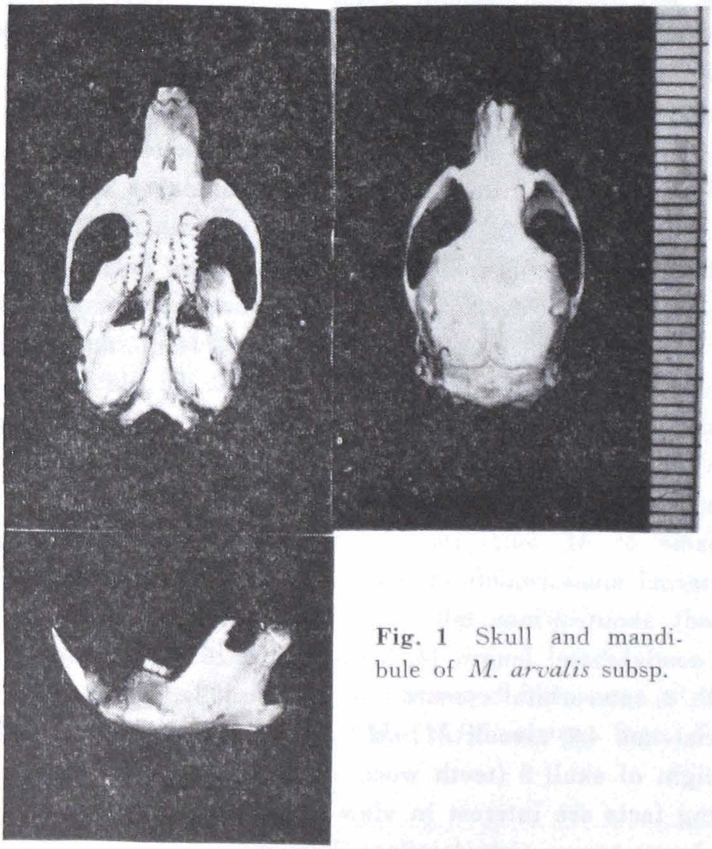


Fig. 1 Skull and mandibule of *M. arvalis* subsp.

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* Institute of Zoology, Kyoto University

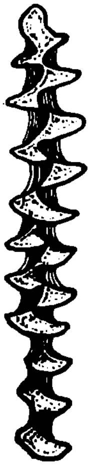

Fig. 2 Enamel folding of left lower molars of *M. arvalis* subsp.

variation of the fur. Present specimen is unsuitable for such subspecific discrimination as it has been preserved in formalin.

By the male specimen the measurements are taken as follow: head and body about 95 mm, tail 39; condylobasal length 24, basal length 22.1, zygomatic breadth 13.5, palatilar length 12, interorbital constriction 3.7, nasal length 6, diastema 6.8, length of foramen incisivium 4.8, alveoli *M1-M3* 5.7, greatest breadth of *M1* 1.2, length of bullae 7, height of skull 8 (teeth worn slightly).

The mouse apparently belongs to Oriental species, *Mus bactrianus*. This specific name was given to the specimen from Kandahar, south Afghanistan. It is far smaller than European house mouse, *M. musculus*. Besides the Oriental species is distinctive in several characteristics: the palate extends posteriorly only slightly behind the level of *M3* and masseteric plate of maxillary evenly rounded in front when the skull is viewed from side (a conspicuous peg-like projection frequently exists at antero-external base of the plate).

The common house mouse in the countries of Far East is named *M. molossinus*. This mouse shows the same cranial characteristics with those of Afghanistan form. However the latter has tail nearly as long as head and body. Here, the name of *M. bactrianus* is retained only for the superiorly of tail length. External measurments of male specimen are approximately as follows: head and body about 69 mm, tail 75, hind foot 16, ear 11.8. Cranial measurements as follows: condylobasal length 18, basal length 16.2, zygomatic breadth 10, palatilar length 8, interorbital constriction 3.7, nasal length 7, diastema 5, length of foramen incisivium 4.8, alveoli *M1-M3* 3.5, greatest breadth of *M1* 1, length of bullae 4, height of skull 5 (teeth worn slightly.)

Following facts are interest in view of biogeography: in the region where the Asiatic house mouse invades into human dwellings we met with outdoor species of vole derived from Europe.

Some Nematocerous Diptera of the North-East of Afghanistan*

By

Masaaki TOKUNAGA**

This report deals with some Nematocerous Diptera mainly collected by Dr. R. Yosii of Kyoto University at high altitude of NE. Afghanistan. This insect material is sorted out into 4 different families: Deuterophlebiidae, Blepharoceridae, Chironomidae and Ceratopogonidae and identified 6 known species, 4 newly named species and 7 un-named species. The last group belongs to the Chironomidae and consists of incomplete species the male sex of which is quite lacking in collection at present.

The specimens examined were mounted by the phenol-balsam method and are deposited in my collection.

Abbreviations used in this report are as follows: AR is antennal ratio showing combined length of 5 distal segments to that of 8 basal preceding in the Ceratopogonidae and length of the last segment to combined length of 13 preceding segments together in the male sex of the Chironomidae. LR is leg ratio showing length of basitarsus to that of tibia usually for fore leg of the Chironomidae. RL is relative length measured by an ocular micrometer under magnification of 150 (1 unit=0.013 mm) in the case of head capsule, wings, wing veins, leg segments and under magnification of 600 (1 unit=0.003 mm) in the case of antennae, maxillary palpi, spermathecae and male hypopygia. RL-8A is relative length of 8 distal antennal segments VII-XIV (Arabic numeral prefixed before A shows number of distal antennal segments). RL-L is relative length of leg segments, excluding coxa and trochanter. RL-V is relative length of wing veins R, M, stem of fMCu, R1 and Rs or R4+5. TR is tarsal ratio showing relative length of tarsal segment I to II.

Family Deuterophlebiidae

1. **Deuterophlebia mirabilis** Edwards

Edwards, 1922, Ann. Mag. Nat. Hist., 9 : 379.

Brodsky, 1930, Zeitschr. Morph. Ökol. Tiere, 18 : 289.

Pupa : Body 3.02-3.09×2.1-2.28 mm.

Specimens examined : 1 ♂ (incomplete) extracted from pupa; 1 ♂ pupa; 4 ♂ pupal exuviae; Kotal-i-Bondarat, Darwaz, NE. Afghanistan, Sept. 6, 1960, together with pupae of *Blepharocera* sp. A.

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* Contribution from the Laboratory of Entomology, Kyoto Prefectural University, No. 94.

** Laboratory of Entomology, Kyoto Prefectural University Kyoto, Japan.

Distributions : Kashmir, Central Asia and Afghanistan.

Family Blepharoceridae

2. **Blepharocera** sp. A of Agharkar. Fig. 1.

Agharkar, 1914, Rec. Ind. Mus., 10 : 159.
Tonnoir, 1930, Rec. Ind. Mus., 32 : 165.

This imperfect species has been reported only on larvae from Kashmir (Nagaberan). The present material consists of pupae only but the dorsal granulation of the pupa is very similar to that of larva showed by Tonnoir with figure.

Male (extracted from mature pupa) : Hypopygium (Fig. 1) with dorsal plate band-like, setigerous ; ventral plate large, shallowly but widely concave on caudal margin, with sparse setae on laterocaudal parts ; guard plates (last hemitergites) subtriangular, highly setigerous ; clasper oval, broad, strongly setigerous, with apical tip slightly concave ; ventral basal lobe (lateral paramere) rod-like, bare, round at tip ; internal lobe (mesal paramere) leaf-like, broad, bare.

Pupa : Body about 4-5×2.5-3 mm.

Specimens examined : 2 ♀♀ and 1 ♂ extracted from mature pupae ; 7 ♀ and 6 ♂ pupal exuviae : 6 ♀ and 6 ♂ pupae ; Kotal-i-Bondarat, Darwaz, NE. Afghanistan, Sept. 6, 1960, together with pupae of *Deuterophlebia mirabilis* Edwards.

Distribution : Kashmir and Afghanistan.

Family Chironomidae

3. **Diamesa** (sen. str.) **filicauda** n. sp. Figs. 2-6.

Large dark brown species closely related to *culicoides* Heeger but larger and more setigerous. Male hypopygium quite specific in possession of filiform apical projection of anal point.

Male : Body 3.12 mm long. Wing 2.67×0.86 mm. Eyes distinctly pubescent, widely separated as wide as length of eye. Palp 5-segmented (12 : 28 : 39×11.5 : 38 : 52). Antenna (Fig. 2) 14-segmented, with normal plumose hairs, XIV as long as 11 preceding segments together, AR 0.84. Thorax entirely dark brown ; scutum with 10 dorsocentral setae ; scutellum with about 12 setae. Legs entirely dark brown ; hind tibial comb with 17-18 apical bristles, tarsal apical spines : fore and mid I-II each with 2 (hind tarsi missing), claws serrulate at tip into 6 seta-like teeth ; LR 0.67, RL-L 83 : 93 : 62.5 : 31 : 20 : 8 : 11 in fore, 84 : 83 : 41 : 23 : 14.8 : 7.5 : 9.4 in mid. Wing with venation and color as in *culicoides* Heeger, RL-V 78 : 62+4 : 58+4 : 58 : 102, r-m very slightly arcuate, 3 times as long as costal tip beyond end of R4+5 and 2 times of basal section of M1+2. Halter white. Abdomen brown. Pypopygium (Fig. 3) : tergite with small setae on caudal part, anal point small, transparent, with caudal filiform projection ; coxite with 2 basal mesal lobes as in Fig. 4 ; style large, about $^{3}/_{4}$ as long as coxite (84 : 114).

Female : Body 3.5-3.6 mm long. Wing 3.6-3.7×1.3-1.4 mm. General color and structure as in ♂, with usual sexual differences. Palp slender, 5-segmented (15 : 28 : 44×14.5 : 46.5 : 72.5). Antenna (Fig. 5) dark brown, 8-segemented (19.3 : 29.2 : 14.4 : 16.3 : 16 : 15 : 13 : 47), VIII subequal to V-VII together. Scutum with 11 (9-14) dorsocentral setae, scutellum with 20-24 setae. Hind tibial comb with 17-21 apical bristles; LR and RL-L of fore 0.7 and 101 : 115.5 : 81 : 35.5 : 22 : 9 : 10. Wing white, RL-V 103 : 83.5+3 : 77+8 : 99 : 144, costal tip about 1/3 of r-m (6.5 : 22), relative length of r-m and related veins as in Fig. 6a. Cercus (Fig. 6b) pale ochreous, subtriangular, with ventral lobe tapered; spermathecae brown, equal, oval.

Holotype : ♂, Mt. Noshaq, 3800 m, NE. Afghanistan, Aug. 27, 1960. *Allotype* : ♀ with type. *Paratypes :* 3 ♀♀ with types.

Distribution : Afghanistan.

This is closely allied to *culicoides* Heeger, but from which may be easily distinguished by the highly specific structure of the male hypopygium, larger size in both sexes and larger AR in male.

4. **Diamesa** (sen. str.) sp. near **confluens** Kieffer. Fig. 7.

Large dark brown species with rather distinct dark scutal vittae separated by brown stripes; antennal structure and wing venation closely similar to those of *culicoides* Heeger, but shape of cerci distinctly different from allied species. Male not collected.

Female : Body 4.19-4.42 mm long. Wing 4.02-4.13×1.5-1.56 mm. Eyes pubescent, separated as wide as length of eye. Palp slender, 5-segmented (17 : 32.5 : 49.5×16.5 : 49 : 84). Antenna (Fig. 7a) with last segment long, tapered, almost straight, 8-segmented (23 : 29.5 : 16.5 : 18.8 : 16.4 : 14.5 : 14.6 : 59.3). Scutum with 12-21 dorsocentral setae, scutellum with 32 setae at least. Legs dark brown, hind tibial comb with about 17 apical bristles; LR 0.77, tarsal segments of mid and hind legs and 4 apical segments of fore missing. Wing with veins brown, R1 extending closely along costa on apical half, r-m strongly arcuate, about 2.7 times of apical tip beyond R4+5 (24.5 : 9), RL-V 118.5 : 97.5+2.5 : 91+7.5 : 103 : 167.5. Halter white. Abdomen brown; cercus (Fig. 7b) yellowish ochreous, ear-like, with ventral lobe short and round at tip.

Specimens examined : 2 ♀♀, Mt. Noshaq, 3800-3900 m, NE. Afghanistan, Aug. 1 and 27, 1960.

Distribution : Afghanistan.

This is very closely allied to European *confluens* Kieffer but probably represents a new species, differing from the allied species in larger LR than 0.64 and smaller body than 5 mm long, but naming is reserved for the collection of the opposite sex.

5. **Diamesa (Adiamesa) culicoides** Heeger. Figs. 8-14.

Heeger, 1853, Sitzungb. Akad. Wien, 10 (7), II.

Synonymy : tonsa Haliday, *pergens* Walker and *pertracta* Walker.

Medium-sized dark brown species. In male, antenna with rather sparse plumose hairs, last segment subequal to 7 preceding together, hypopygium with anal point well developed, rod-like, coxite with 2 very small mesal lobes, style tapered, slightly arcuate. In female, palp slender, antenna 8-segmented, cercus subtriangular.

Male: Body 2.86 mm long. Wing 2.34×0.83 mm. Eyes pubescent, separated as wide as length of eye. Palp slender, 5-segmented (9 : 18 : 30×12 : 25 : 40). Antenna (Fig. 8) with rather sparse plumose hairs, AR 0.6, RL-8A 10 : 10 : 13 : 14 : 15 : 14 : 15 : 95, XIV subequal to VII–XIII together. Scutum with only 7 dorsocentral setae, scutellum ochreous, with 13 setae. Legs brown, mid and hind tarsi with 2 apical small spines on I and II, hind tibial comb with 15 apical bristles, fore tarsi missing. Wing with veins brown, slender, RL-V 68 : 55+3 : 51+3 : 54 : 91.5, costal tip beyond R4+5 1/5 of r–m (3 : 15), r–m slightly arcuate. Hater white. Abdomen ochreous. Hypopyium (Fig. 9) brown, with long rod-like anal point; coxite with 2 setigerous small mesal lobes as in Fig. 10; style tapered, slightly arcuate.

Female: Body 2.6–2.73 mm long. Wing 2.99–3.0×1.14–1.17 mm. General structure and color as in ♂ with usual sexual differences. Palp (Fig. 11) 5-segmented (10 : 25 : 36.5×12.5 : 42.5 : 64.5). Antenna (Fig. 12) 8-segmented (16.7 : 22.3 : 13.2 : 13.5 : 12.5 : 12.7 : 11.3 : 40), last segment longer than 3 preceding ones together. Pronotum ochreous, scutum with 6–9 dorsocentral setae, scutellum with 23–25 seate. Legs with 2 small tarsal spines on apical end of I–II, hind tibial comb with 18–20 apical bristles; LR and RL-L of fore 0.75 and 78.3 : 86.5 : 65 : 28.5 : 17.4 : 7.5 : 8.8. Wing (Fig. 13) with veins pale brown, membrane very pale brown, R1 extending closely along costa on apical 2/3, r–m subequal to or longer than 3 times of costal tip (18 : 5–6), RL-V 81 : 64+3 : 59.5+4.8 : 65.5 : 107. Abdomen dusty ochreous; cercus (Fig. 14) very pale, elongate subtriangular, with ventral projection.

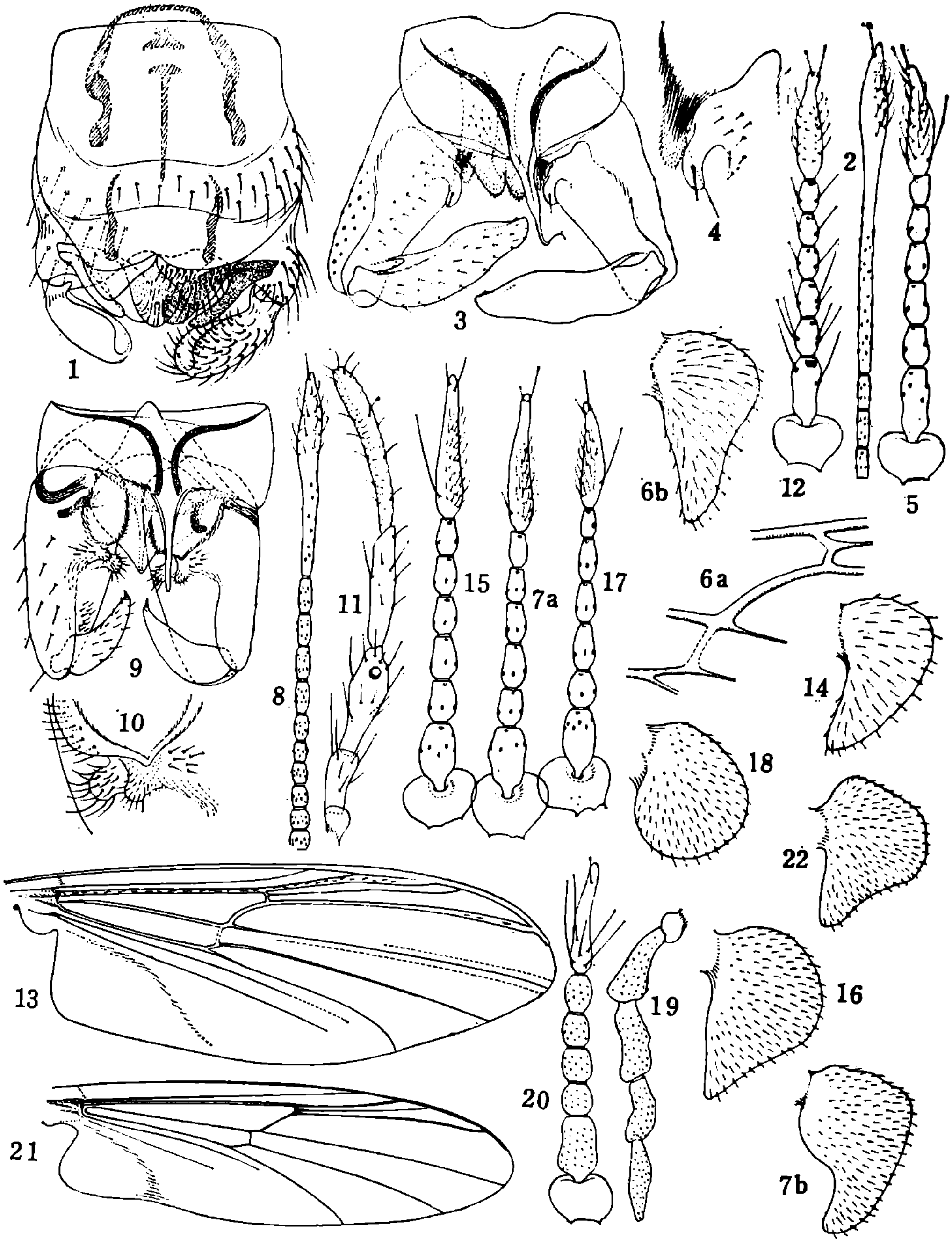
Specimens examined: 1 ♀ and 1 ♂, Mt. Noshaq, 3800 m, NE. Afghanistan, Aug. 27, 1960; 5 ♀♀, Mt. Noshaq, 3900 m, Aug. 1, 1960.

Distribution: England, Austria, Tyrol, and Afghanisan.

6. **Diamesa (Adiamesa)** sp. near **ursus** Kieffer. Figs 15–16.

Large brown or dark brown species, body and wing length about 5 mm, antenna with last segment tapered, straight, long; wing vein r–m strongly curved; cercus round on dorsal half, pointed on ventral lobe. Male not collected.

Female: Body 4.5–4.89 mm long. Wing 4.96–5.57×1.76–1.77 mm. Eyes pubescent, more narrowly separated than length of eye (24.2 : 28). Palp slender, dark brown, 5-segmented (18.2 : 41 : 60×16.4 : 65.5 : 103.7). Antenna (Fig. 15) dark brown, 8-segmented (22.8 : 31.9 : 18.2 : 20 : 17.3 : 17.8 : 15.5 : 59.2). Thorax largely brown; scutum with 3 dark vittae rather distinct, dorsocentral setae 11–13; scutellum highly setigerous with about 34 setae. Legs dark brown; hind tibial comb with



Blepharocera sp. A, ♂ : Fig. 1, hypopygium. *Diamesa filicauda*, ♂ : Fig. 2, apical part of antenna; 3, hypopygium; 4, mesal lobes of coxite; ♀ : Fig. 5, antenna; 6a, wing vein r-m; 6b, cercus. *Diamesa* sp. nr. *confluens*, ♀ : Fig. 7a, antenna; 7b, cercus. *Diamesa culicoides*, ♂ : Fig. 8, apical part of antenna; 9, hypopygium; 10, mesal lobes of coxite; ♀ : Fig. 11, palp; 12, antenna; 13, wing; 14, cercus. *Diamesa* sp. nr. *ursus*, ♀ : Fig. 15, antenna; 16, cercus. *Diamesa* sp. nr. *ammon*, ♀ : Fig. 17, antenna: 18, cercus. *Syndiamesa nivosa*, ♀ : Fig. 19, palp; 20, antenna; 21, wing; 22, cercus.

20 apical bristles; tarsi of all legs missing. Wing with veins brown, membrane pale brown, R1 thickened and closely extending along costa on apical half, r-m strongly arcuate, 3 times as long as costal produced tip (30.7 : 97.7), RL-V 147.4 : 115.8+5.6 : 112.5+9.8 : 144.2 : 228.8. Halter white. Abdomen brown, cercus (Fig. 16) pale ochreous, with dorsal half round, ventral half triangular and pointed; spermathecae 2, equal, oval or short oval.

Specimens examined: 1 ♀, Mt. Noshaq, 3900 m, NE. Afghanistan, Aug. 1, 1960; 1 ♀, floated on pool of glacier, Mt. Noshaq, 4800 m, Aug. 17, 1960.

Distribution: Afghanistan.

This is very closely allied to *ursus* Kieffer and probably identical with it, but the male was not observed, then the naming is reserved at present.

7. **Diamesa (Psilodiamesa)** sp. near **ammon** Haliday. Figs. 17-18.

Large dark brown species with halters and cerci white, abdomen pale brown; fore femur with long hairs on middle part, other posterior femora with similar long hairs sparsely on basal parts only; cerci round. Male not collected.

Female: Body about 4.62 mm long. Wing 3.85-4.1×1.74 mm. Eyes bare, separated broadly than length of eye (25 : 23). Palp slender, 5-segmented (16 : 34.5 : 59×18 : 60.5 : 80). Antenna (Fig. 17) dark, 8-segmented (25.5 : 30.5 : 18.8 : 23 : 22 : 20 : 17.3 : 53.5), last segment slightly shorter than 3 preceding together. Thorax dark but humeral areas brown; scutum with 13-15 dorsocentral setae, scutellum brown, highly setigerous with 40 or more setae. Legs entirely dark brown, fore femur with long hairs on middle part, fore and mid tarsal segments I-III each with 2 small apical spines, hind tibial comb with 25 apical bristles; LR and RL-L of fore 0.71 and 125 : 134 : 95 : 43.5 : 27.5 : 9 : 10.5. Wing with veins brown, R1 extending closely along costa on apical 1/3, r-m slightly arcuate, 3 times as long as costal tip beyond R4+5 (29 : 10), RL-V 134 : 108+6 : 101+9 : 117 : 185. Halter white. Abdomen largely yellowish ochreous, with basal tergite brown; cercus (Fig. 18) small, white, round

Specimens examined: 2 ♀♀; Mt. Noshaq, 3900 m, NE. Afghanistan, Aug. 1, 1960.

Distribution: Afghanistan.

This is probably identical to European *ammon* Haliday but the exact identification is difficult on the female sex only.

8. **Syndiamesa** (sen. str.) **nivosa** Goetghebuer. Figs. 19-22.

Goetghebuer, 1928, Dipt. IV, fasc. 3 : 123.

Large shiny black species with long slender hairs on head, legs, antennae, palpi, legs and abdomen; wing with cross vein r-m straight and as long as costal tip beyond R4+5.

Female: Body about 5 mm long. Wing 4.29×1.5 mm. Eyes bare, separated more widely than length of eye; clypeus highly setigerous. Palp stout, with dense slender hairs, 5-segmented (6 : 17 : 17 : 12 : 16) as in Fig. 19. Antenna (Fig. 20) short, with dense long hairs, 7-segmented (6.7 : 11.7 : 5.5 : 6 : 6 : 6.3 : 20.7) ; last segment slender, longer than 3 preceding together. Legs dark; all femora with slender long hairs, fore and mid tibiae with similar hairs on basal parts, hind tibia on entire length; tarsal apical spines on I-III of fore, I-IV of other legs; LR and RL-L of fore 0.59-0.61 and 120.7 : 133.9 : 80.3 : 43.7 : 31.5 : 20 : 19.1. Wing (Fig. 21) with r-m straight, as long as costal tip (15 : 15), RL-V 165 : 139+9 : 120 +15 : 88 : 155. Halter brown. Abdomen dark brown; cercus (Fig. 22) brown, round on dorsal half, subtriangular on ventral half and blunt on tip of ventral lobe; spermathecae 3, rather small, equal, short oval (3+35×33).

Specimens examined: 1 ♀, floated on pool of glacier, Mt. Noshaq, 4800 m, Afghanistan, Aug. 17, 1960; 2 ♀♀, Mt. Noshaq, 3800 m, Aug. 13, 1960.

Distribution: Europe and Afghanistan.

9. **Orthocladius** (sen. str.) sp. near **frigidus** Zetterstedt. Figs. 23-26.

Small dark or dark brown species with subconfluent dark scutal vittae; antenna with last segment slightly hooked and clavate at tip; wing with brown stripes on apical half of cell R1 and along under side of apical part of vein M1 +2, R2+3 extending along R1. Male not collected.

Female: Body 2.02-2.08 mm long. Wing 2.12-2.35×0.85 mm. Eyes bare, separated as wide as length of eye. Palp 5-segmented (8 : 18.5 : 23.5×10 : 23.5 : 40.5). Antenna (Fig. 23) 6-segmented (12.5 : 25 : 14 : 14.5 : 15 : 35), last segment somewhat hooked and clavate at tip. Thorax with scutal lateral sides, humeral areas and scutellum yellowish ochreous; scutum with only 5-6 dorsocentral setae, scutellum with 7-8 setae. Legs brown, without pulvilli, hind tibial comb with 11-12 apical bristles: LR 0.6-0.62, RL-L of fore 52.5 : 54.5 : 33.3 : 22.5 : 16.5 : 10.5 : 8. Wing (Fig. 24) without macro- and microtrichia, costa scarsely produced beyond tip of R4+5, R2+3 ending near tip of R1 than that of R4+5 (8.5 : 34), RL-V 57.5 : 55.5 : 64 : 40.8 : 83.5, fMCu scarsely beyond r-m. Halter white. Abdomen ochreous or pale brown; cercus (Fig. 25) yellowish, ear-like, with 2 strong bristles; lateral lobe of last segment (Fig. 26) thumb-like.

Specimens examined: 17 ♀♀, Mt. Noshaq, 3900 m, NE. Afghanistan, Aug. 1, 1, 1960.

Distribution: Afghanistan.

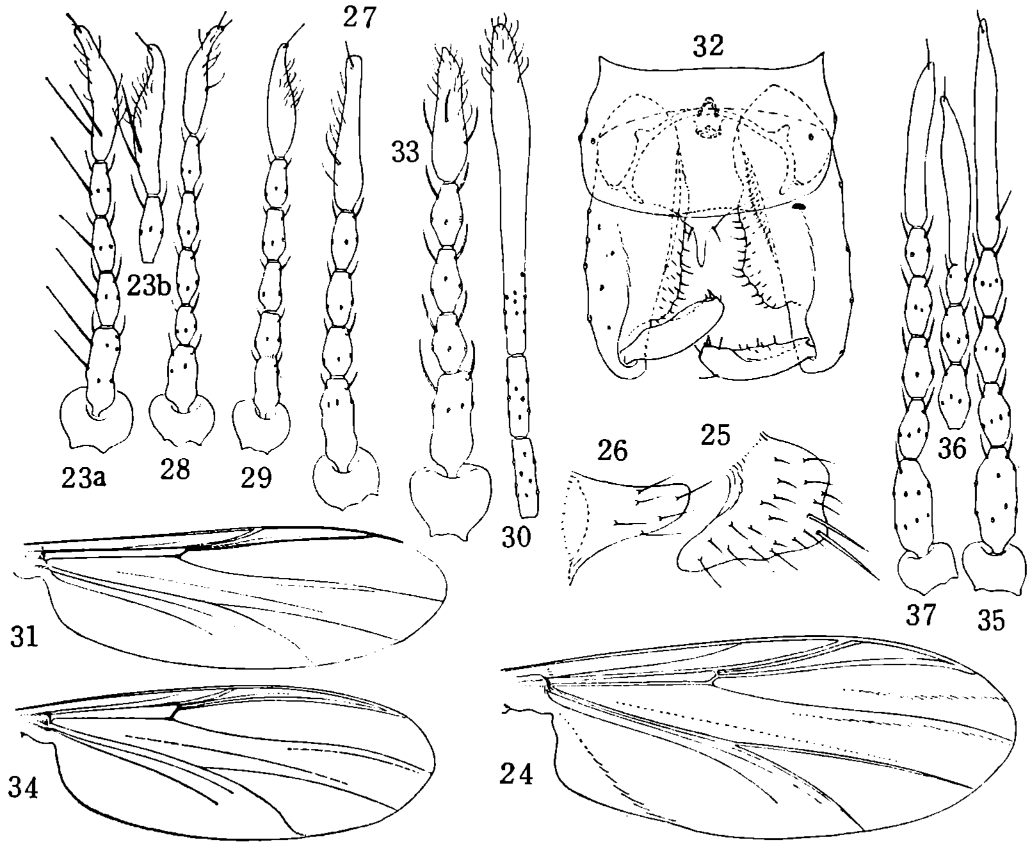
This is probably identical to Europan *frigidus* Zetterstedt but the exact identification is difficult on the female sex alone.

10. **Orthocladius** (sen. str.) sp. Afg-No. 1. Fig. 27.

Medium-sized yellowish species with 3 short dark bark brown distinct vittae on scutum; antenna with last segment rather long, straight; wing slender, with fMCu under r-m. Male unknown.

Female: Body 4.13 mm long. Wing 3.38×1.2 mm. Head dark brown but with frons pale; eyes bare. Palp brown, slender, 5-segmented (13 : 20 : 43 : 39 : 60). Antenna (Fig. 27) dark, 6-segmented (20 : 30 : 16 : 18 : 20 : 53), VI straight, rather long. Pronotum yellowish ochreous, only brownish on lateral sides; scutum yellow, with 3 short dark brown vittae, 14 dorsocentral setae; scutellum yellow, with about 32 setae; postscutellum and sternopleuron dark; pleura yellow, with brown spot before wing basis. Legs brownish, tibiae and tarsi missing. Wing slender, squama with complete fringe, costa scarcely produced beyond tip of R4+5, R2+3 ending very near tip of R1 than that of R4+5 (22 : 57), fMCu under r-m, RL-V 88 : 87 : 90 : 67 : 135. Halter pale ochreous. Abdomen ochreous, with last segment brown; cercus yellowish ochreous, ear-like, with ventral lobe distinct and round at tip.

Specimen examined: 1 ♀, Mt. Noshaq, 3900 m, NE. Afghanistan, Aug. 1, 1960.



Orthocladius sp. nr. *frigidus*, ♀ : Fig. 23a, antenna; 23b, apical 2 segments of other ♀ : 24, wing; 25, cercus; 26, lateral lobe of last segment. *Orthocladius* sp. Afg-No. 1, ♀ : Fig. 27, antenna. *Orthocladius* sp. Afg-No. 2, ♀ : Fig. 28, antenna. *Trichocladius* sp. Afg-No. 1, ♀ : Fig. 29, antenna. *Nanocladius altimontanus*, ♂ : Fig. 30, apical part of antenna; 31, wing; 32, hypopygium; ♀ : Fig. 33, antenna; 34, wing. *Himatendipes glacies*, ♀ : Fig. 35, 6-segmented antenna; 36, incompletely 7-segmented antenna; 37, 7-segmented antenna, *Distribution:* Afghanistan.

11. **Orthocladius** (sen. str.) sp. Afg-No. 2. Fig. 28.

Medium-sized dark brown species; antenna 7-segmented, with last segment slightly hooked at tip, subequal to 2 preceding segments together, scutal vittae subconfluent and indistinct, scutal dorsocentral setae only 7-8 and scutellum with 8 setae; wing membrane quite bare, fMCu just before r-m, cell M2 distinctly narrowed at level of tip of R1. Male not collected.

Female: Body 2.5-2.76 mm long. Wing 2.5-3.02×0.94-1.14 mm. Eyes bare. Palp slender, 5-segmented (10 : 17 : 32.5 : 34.5 : 59.5). Antenna (Fig. 28) 7-segmented (12 : 20.5 : 15.5 : 17 : 17.5 : 16.5 : 36.5), VII slightly clavate and curved at tip. Pronotum pale brown, other sclerites dark, scutal vittae indistinct; scutal dorsocentral setae only 7-8, scutellum with only 8 setae. Legs brownish, major segments missing. Wing without microtrichia, squama with 10-14 marginal setae, costa ending above tip of M3+4, just produced beyond tip of R4+5, cell M2 distinctly narrowed at level of tip of R1 by sinuous M1+2, R2+3 ending very near R1 than R4+5 (10 : 50.5), R4+5 not extending closely along costa at tip, fMCu just before r-m, RL-V 75.5 : 73 : 72.5 : 50.5 : 109. Halter white. Abdomen pale brown, basal tergite and last segment dark brown; cercus brown, ear-like.

Specimens examined: 3 ♀♀, Mt. Noshaq, 3900 m, NE. Afghanistan, Aug. 1, 1960.

Distribution: Afghanistan.

12. **Trichocladius (Acricotopus)** sp. Afg-No. 1. Fig. 29

Medium-sized brown species with 3 dark brown distinct vittae on scutum; antenna 7-segmented, eyes pubescent, legs with vestigial pulvilli, wing slender, with microtrichia dot-like, costa produced beyond tip of R4+5, anal lobe of wing round. Male not known.

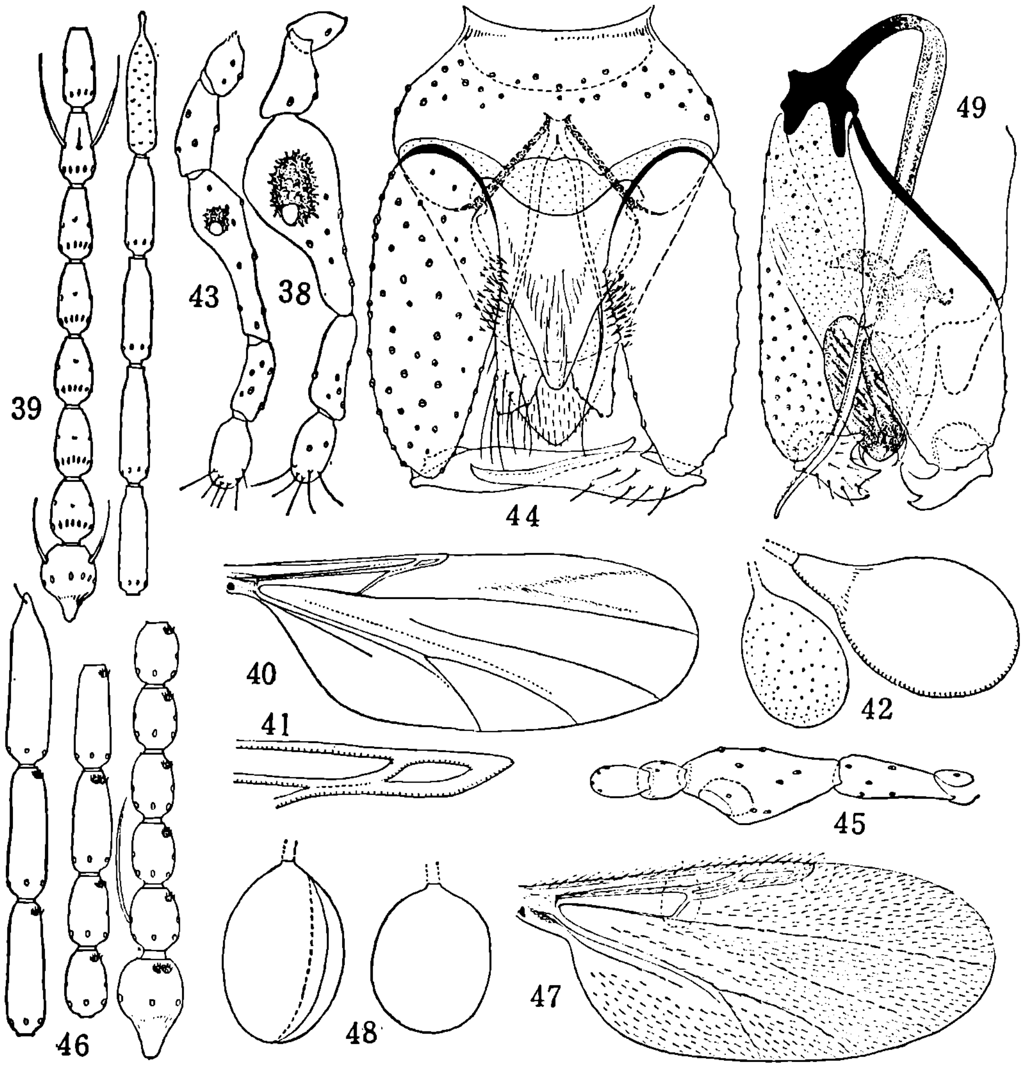
Female: Body 2.99 mm long. Wing 2.96×0.99 mm. Head dark brown, with frons brown. Eyes distinctly pubescent, separated as wide as length of eye. Palp dark brown, slender, last segment missing. Antenna (Fig. 29) dark brown, 7-segmented (14 : 18 : 15 : 16 : 18 : 16 : 35), VII slightly clavate and hooked at tip. Thorax largely brown, scutum with 3 dark short vittae, 10-11 dorsocentral setae; scutellum with 17 setae. Legs dark brown, with pulvilli vestigial; LR 0.64, RL-L of fore 75 : 78 : 50 : 29.5 : 21 : 14.5 : 11. Wing with veins slender, anal lobe round, microtrichia dot-like, squama fringed with 22 setae, costal tip bayond tip of R4+5 longer than r-m (10:6), R2+3 ending near R1 than R4+5 (21 : 40), fMCu just before r-m, 1A almost reaching wing margin, RL-V 75 : 71 : 83 : 57 : 114. Halter white. Abdomen brown, base and caudal end dark brown; cercus pale ochreous, ear-like.

Specimen examined: 1 ♀, Mt. Noshaq, 3900 m, NE. Afghanistan, Aug. 1, 1960.

Distribution: Afghanistan.

13. **Nanocladius altimontanus** n. sp. Figs. 30–34

Small yellowish species ; thorax with 3 dark brown short vittae on scutum, wing with costal tip beyond R4+5 longer than r-m ; male with last antennal segment short, subequal to 4 preceding segments taken together, hypopygium with anal point small, mesal lobe of coxite broad ; female with 6-segmented antennae, last antennal segment short, only 2 preceding together in length, wing vein R4+5 very closely extending along costa on distal part.



Forcipomyia monticolonia, ♀ : Fig. 38, palp ; 39, antenna, excluding basal 1 ; 40, wing ; 41, wing veins of radial cells ; 42, spermathecae ; ♂ : Fig. 43, palp ; 44, hypopygium. *Culicoides noshaquensis*, ♀ : Fig. 45, palp ; 46, antenna ; 47, wing ; 48, spermathecae. *Bezzia calceata*, ♂ : Fig. 49, hypopygium.

Male: Body 2.02 mm long. Wing 1.91–1.95×0.61 mm. Head yellow but vertex dark brown; eyes bare, separated far widely than length of eye (19.5 : 15). Palp slender, 5-segmented (7 : 12.5 : 24 : 26 : 36.5). Antenna (Fig. 30) with last segment short, crowned with delicate hairs, subequal to 4 preceding together, RL-8A 14 : 14 : 14 : 13 : 14 : 14 : 15 : 56, AR 0.34. Thorax with 3 distinct short dark brown vittae on scutum, pleuron with 1 dark spot, sternopleuron dark brown, scutum probably with 4–5 dorsocentral setae, scutellum probably with 5–6 setae. Legs almost entirely yellowish ochreous, LR 0.58, RL-L of fore 50 : 49 : 28.5 : 22 : 15.5 : 9.5 : 7. Wing (Fig. 31) with veins pale, without microtrichia on membrane, squama fringed with 7–8 setae, r–m shorter than costal tip (3 : 6.5), RL-V 50 : 47.5 : 58 : 24 : 63. Halter white. Abdomen yellowish ochreous; hypopygium (Fig. 32) with anal point small, mesal lobe of coxite broad, style small.

Female: Body 2.05–2.16 mm long. Wing 1.99–2.0×0.77–0.78 mm. General color and structure as in ♂ with usual sexual differences. Palp 5-segmented (9 : 12.5 : 25.5 : 28 : 40.5). Antenna (Fig. 33) 6-segmented (13 : 20 : 14.5 : 14.5 : 13.5 : 28.5), last segment short, rather pointed. LR 0.6, RL-L of fore 48 : 47 : 28 : 20 : 14 : 8.5 : 6.5. Wing (Fig. 34) with costa ending above tip of M3+4, R4+5 curved, extending closely along costa, r–m half as long as costal tip beyond R4+5 (5 : 10), RL-V 50 : 46 : 60 : 22 : 71.5. Abdomen pale ochreous.

Holotype: ♂, Mt. Noshaq, 3800 m, NE. Afghanistan, Aug. 27, 1960. *Allotype:* ♀, Mt. Noshaq, 3900 m, Aug. 1, 1960. *Paratypes:* 1 ♂ with holotype; 6 ♀♀ with allotype.

Distribution: Afghanistan.

This is very closely allied to S. African *angustistibus* Freeman but the allied species is somewhat different in the following points: in ♂, AR 0.4, LR 0.7, hypopygium with anal point quite bare, mesal lobe of coxite subtriangular; in ♀, last antennal segment somewhat longer than 2 preceding together.

14. **Himatendipes glacies** Tokunaga. Figs. 35–37

Tokunaga, 1959, Akitu, 8 : 21.

Large dark species reported only on male sex.

Female: Body 3.25–3.41 mm long. Wing 3.64–3.86×1.0–1.08 mm. General color and structure as in ♂. Head without frontal tubercles. Palp 5-segmented (14.5 : 19.5 : 53 : 45 : 69.5). Antenna (Figs. 35–37) 6- or 7-segmented [20 : 46 : 27.7 : 29.7 : 27 : (97 or 18.5 : 72)]. Scutum with 6–10 dorsocentral setae, scutellum with 11–14 setae. LR 1.1, RL-L of fore 92 : 76.5 : 84 : 40.8 : 27 : 19.3 : 16. Wing with r–m horizontal, fMCu just before r–m, RL-V 119 : 111 : 105.5 : 94.5 : 141.5. Abdomen with cerci brown.

Specimens examined: 3 ♀♀, floated on pool of glacier, Mt. Noshaq, 4800 m, NE. Afghanistan, Aug. 17, 1960; 5 ♀♀, Mt. Noshaq, 3800 m, Aug. 13, 1960.

Distribution: Kashmir and Afghanistan.

The generic and specific characters were reported on male specimens from

Kashmir in the original paper.

Family Ceratopogonidae

15. **Forcipomyia** (sen. str.) **monticolonia** n. sp. Figs. 38-44

Medium-sized ochreous or brownish species with unmarked wings and legs, scales very slender. Female with AR about 1.0, hind TR 0.81, spermathecae quite unequal; male with hind TR 0.92, coxites of hypopygium with spinules on mesal side of basal parts, parameres very slender.

Female: Body about 2.19 mm long. Wing 1.92×0.72 mm. General color pale ochreous but head and thorax largely brown, with scutellum yellow. Head with antennae and palpi brown, frons very pale ochreous. Eyes bare, just separated. Palp (Fig. 38) with III inflated on basal part or half, sensory pore large, RL-P 12.5 : 20.6 : 42.1×18.8 : 20.6 : 15.2. Antenna (Fig. 39) with AR 1.0, RL-8A 16.6 : 17 : 17.5 : 26 : 25.5 : 24.2 : 23.2 : 34×7.9, basal segments of flagellum oval to elongate oval. Thorax largely brown, lateral parts and foveae of scutum somewhat paler, scutellum pale yellow; scutellum strongly setigerous. Legs mainly pale brown but coxae pale yellow, with scales slender, 1- or 2- striated; hind tibial comb with 9-10 apical bristles; TR and RL-L 0.87 and 45 : 45.9 : 15 : 17.3 : 11.2 : 8.5 : 6.8 in fore, 0.75 and 54.5 : 57.1 : 15.6 : 20.8 : 12.1 : 8.7 : 6.9 in mid, 0.81 and 58.9 : 58.4 : 19 : 23.4 : 13.9 : 10.4 : 6.9 in hind. Wing (Fig. 40) entirely very paly ochreous, unmarked, with CR 0.47, fMCu under basal part of second radial cell, first radial cell (Fig. 41) slit-like, second elongate triangular and 1.5 times as long as first (10 4 : 6.9), RL-V 33.8 : 30.3 : 58 : 12.1 : 22.5. Halter white. Abdomed ochreous entirely, with scales nonstriated. Spermathecae (Fig. 42) oval, unequal, 1 dark brown, large, pyriform (24.6×14.3), 1 yellow, small, elongate oval (0.9+14.6×0.98).

Male: Body 2.67 mm long. Wing 2.04×0.62 mm. Color as in ♀ or more brownish. Eyes almost contiguous. Palp (Fig. 43) with III slender, sensory pore on basal part, RL-P 12 : 21 : 27×10 : 17 : 17. Antenna with RL of II-X to XI-XIV taken together 153 : 156, RL-8A 12 : 12 : 13 : 13 : 50 : 36 : 27 : 37.5. Scutellum paler than scutum, with about 18 large and 30 small setae. Legs pale brown but coxae brown, with scales as in ♀, claws normal, hind tibial comb with 10 apical bristles.

TR and RL-L 1.21 and 41 : 42.5 : 17 : 14 : 9.8 : 7 : 6.8 in fore, 0.91 and 57 : 54 : 16 : 17.5 : 11 : 7.5 : 6.8 in mid, 0.92 and 62.5 : 57.5 : 18 : 19.5 : 13 : 8.5 : 7 in hind. Wing with costa ending before fMCu, CR 0.39, first radial cell absent, second subtriangular, about half as long as stem of second cell (7 : 13), RL-V 38 : 35 : 68 : 16.5 : 22. Abdomen almost uniformly brown. Hypopygium (Fig. 44) darker, with coxite elongate, distinctly spinulous on mesal side of basal part; style tapered, almost straight, about 0.7 as long as coxite (49 : 70); aedeagus elongate triangular; parameres and basal arms very slender.

Holotype: ♀, Mt. Noshaq, 3800 m, NE. Afghanistan, Aug. 27, 1960. *Allotype:*

♂ with type. *Paratypes:* 2 ♀♀ and 6 ♂♂ with types.

Distribution: Afghanistan.

This is very closely allied to New Guinean *spinuliforceps* Tokunaga in the structure of the male hypopygium but, in the allied species, ♂ antennal segment XI is longer than following 2 combined, ♀ palpal segment III is rather slender, AR is about 0.61, 7 penultimate antennal segments are subequal in length to each other, spermathecae are unequal but both oval and dark brown, differing from the Afghanistan new mountain species.

16. **Culicoides noshaquensis** n. sp. Figs 45-48

Small brown species allied to *odiatus* Austen, with very paint small pale spots on costal area of wing.

Female: Body 1.73 mm long. Wing 1.55×0.65 mm. Head pale brown but vertex brown. Eyes bare, just separated as wide as half of facet. Proboscis slightly longer than half of head length (14 : 22). Palp (Fig. 45) 5-segmented (8 : 17 : 25×11 : 8 : 10 ?), with large sensory pore; mandible with 12 cutting teeth. Antenna (Fig. 46) brown, AR 1.16, RL-8A 9.8 : 9.8 : 10×7 : 16 : 17 : 19 : 20 : 27 × 7.5, sensory tufts present on II-XIII. Thorax with tergites brown, pleurites and sternites paler, scutum without distinct markings, scutellum with 4 large and 7 small setae. Legs entirely pale brown, but knees somewhat fuscous; claws simple, tarsi IV cylindrical, hind tibial comb with 4-5 apical bristles, tarsal apical spine-like bristles only on mid I-IV. TR and RL-L 2.04 and 29.4 : 29.5 : 14.3 : 7 : 4.5 : 3.4 : 4.5 in fore, 2.66 and 36 : 37 : 21.3 : 8 : 5 : 3.5 : 4.5 in mid, 1.8 and 37.5 : 37 : 18 : 10 : 6 : 3.5 : 4.5 in hind. Wing (Fig. 47) very pale ochreous, almost entirely hairy, with 2 very faint small pale spots, second costal spot being far smaller and just beyond radial cell. Halter white. Abdomen entirely very pale ochreous; spermathecae (Fig. 48) brown, short oval (13.5×11.5), subequal.

Holotype: ♀, Mt. Noshaq, 3800 m, NE. Afghanistan, Aug. 27, 1960.

Distribution: Afghaistan.

This is very closely allied to *odiatus* Austen, from which, however, may be rather easily distinguished by smaller TR (fore less than 2.21, mid than 2.9, hind than 1.93) and smaller AR less than 1.7.

17. **Bezzia calceata** Walker Fig. 49

Walker, 1856, Ins. Brit., III (239) : 81.

Synonymy: *trilobata* Kieffer and ? *albipes* Winnertz.

Medium-sized black species with wings transparent and tarsal segments I-III of all legs white.

Male: Body 2.34 mm long. Wing 1.59×0.44 mm. Eyes separated as wide as 3 facets. Palp slender, 5-segmented (7 : 11 : 19 : 14 : 13). Scutum densely setigerous with small stiff setae entirely, without microtrichia, supra-alar bristles 8-9, anterior tubercle invisible; scutellum with small stiff setae as in scutum besides 3 pairs of strong bristles. Legs dark, tarsal segments I-III white, IV-V brown;

fore femur with 2 ventral spines beyond middle, mid tibia with 3 apical spines, hind tibia with 5-6 very strong dorsal bristles and 1 apical spine-like bristles besides spurs, hind tibial comb with 6 apical bristles, tarsal apical spines: fore and hind I each with 1, mid I-II each with 2; TR and RL-L 2.0 and 42 : 36 : 21 : 10.5 : 6.8 : 4 : 7 in fore, 2.12 and 50 : 43 : 26.5 : 12.5 : 7 : 4 : 7 in mid, 2.15 and 55 : 53 : 28 : 13 : 8 : 4 : 7 in hind. Wing quite transparent, costa ending before tip of M_{3+4}, CR 0.64, RL-V 40 : 39 : 50 : 17 : 31, R_1 ending before tip of Cu_1, R_1 and Rs straight, short, bases of M_1 and M_2 just separated, fMCu under mid of R_1. Halter with knob dark, base and stem brown. Abdomen with subcutaneous dark pigment, tergites dark brown, sternites and pleural sides very pale. Hypopygium (Fig. 49) dark, elongate, large; style 3-dentated; aedeagus short, broad on apical part, strongly thickened on basal part; parameres very long, slender, tape-like.

Specimen examined: 1 ♂, Kabul, NE. Afghanistan, June 19, 1960.

Distribution: Europe, Central Asia and Afghanistan.

Crustacea (Cladocera, Copepoda and Amphipoda) collected by the Kyoto University Pamir-Hindukush Expedition 1960

By

Masuzo UÉNO *

The plankton was collected by Dr. Riozo YOSII from eight localities, of which six were lakes, ponds and a pool and the remaining two were wells. The collections from only four of those contained plankton animals which were represented by crustaceans, at least one species of Cladocera or Copepoda and as many as three in only one locality. The material from Lake Shiwa contained no plankton organisms, having only mayfly exuviae which will be described by the present writer in the other article of this series of reports. The bodies of cold water located on the glacier in the Quazdeh valley on Mt. Noshaq and wells at Kabul appear to be not habitable for planktonic and other organisms. The present report deals, therefore, with only Cladocera and Copepoda found in the materials collected by a plankton-net, together with an amphipod of the genus *Gammarus* collected in the shore of Lake Shiwa.

List of the Localities

1. Kabul, Afghanistan, an eutrophic pond in the suburbs of the town, June 22, 1960, —— *Simocephalus exspinosus.*
2. A dam on the way to Pagman from Kabul, June 17, 1960, —— *Daphnia similis, Ceriodaphnia laticaudata, Cyclops viridis.*
3. A pond (conveniently called by local Japanese as "Shinobazu-ike") at Pagman, June 17, 1960, —— *Daphnia similis, Scapholeberis mucronata.*
4. A pool along the Bamyan river, near Doab, July 2, 1960, —— *Cyclops viridis* (juv.).
5. Quazdeh valley, Mt. Noshaq, a small lake on the glacier, July 14 and 16, 1960, —— organic detritus only.
6. Lake Shiwa (Shewa), September 9, 1960, —— *Gammarus.*

7-8. Well at Kabul, June 20, 21, 1960.

List of the Species found

I. CLADOCERA

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* Kyoto University and Konan Women's College.

1. *Daphnia similis* CLAUS
   Loc. no. 2 and no. 3.
2. *Scapholeberis mucronata* (O. F. MÜLLER)
   Loc. no. 3.
3. *Simocephalus exspinosus* (KOCH)
   Loc. no. 1.
4. *Ceriodaphnia laticaudata* P. E. MÜLLER
   Loc. no. 2.

II. COPEPODA

5. *Cyclops* (*Acanthocyclops*) *viridis* (JURINE)
   Loc. no. 2 and no. 3.

III. AMPHIPODA

6. *Gammarus* (*Rivulogammarus*) *kuphelectus* sp. n.
   Loc. no. 6.

I. CLADOCERA

1. **Daphnia similis** CLAUS

Occurrence: The plankton of "Shinobazu-ike" at Pagman (loc. no. 3) consisted only of this species, while in a dam on the way to Pagman from Kabul it was found in lesser numbers than in loc. no. 3, together with *Ceriodaphnia laticaudata* and *Cyclops viridis*.

Both populations are characterized in having rounded head (Figs. 1-1 and 1-3), as in *Daphnia carinata* KING forma *typica* illustrated by G. O. SARS (1914, pl. I, fig. 1). The present populations are, however, identical with CLAUS' *Daphnia similis* according to BROOKS' recent designation (BROOKS, 1957, p. 32), particularly in the structure of mid-dorsal ridge of carapace (Fig. 1-2).

Females of both populations are small, 1.4 mm. long in head and carapace, length including shell-spine up to 2 mm., not so large as SARS' *typica* (up to 3.2 mm.) or BROOKS' (up to 3.5 mm.). Dorsal margin of head and carapace not produced as a keel, with prolongation of mid-dorsal ridge of carapace to the level of the bases of antennae (Fig. 1-2). Ventral margin of head nearly straight or very slightly convex from the posterior edge of optic vesicle to rostral end. Apex of rostrum blunt or acute, directed ventrally or postero-ventrally (Figs. 1-4 and 1-5). Antennules large, with about 8-9 sense hairs extending to the apex of rostrum. Compound eye relatively small; optic vesicle rather large, closely approaches the ventral margin of head. Ocellus small. Fornix well developed, extending anteriorly over the optic vesicle and ending posteriorly in an acute process, directed ventrally and somewhat laterally. Carapace arched ventrally

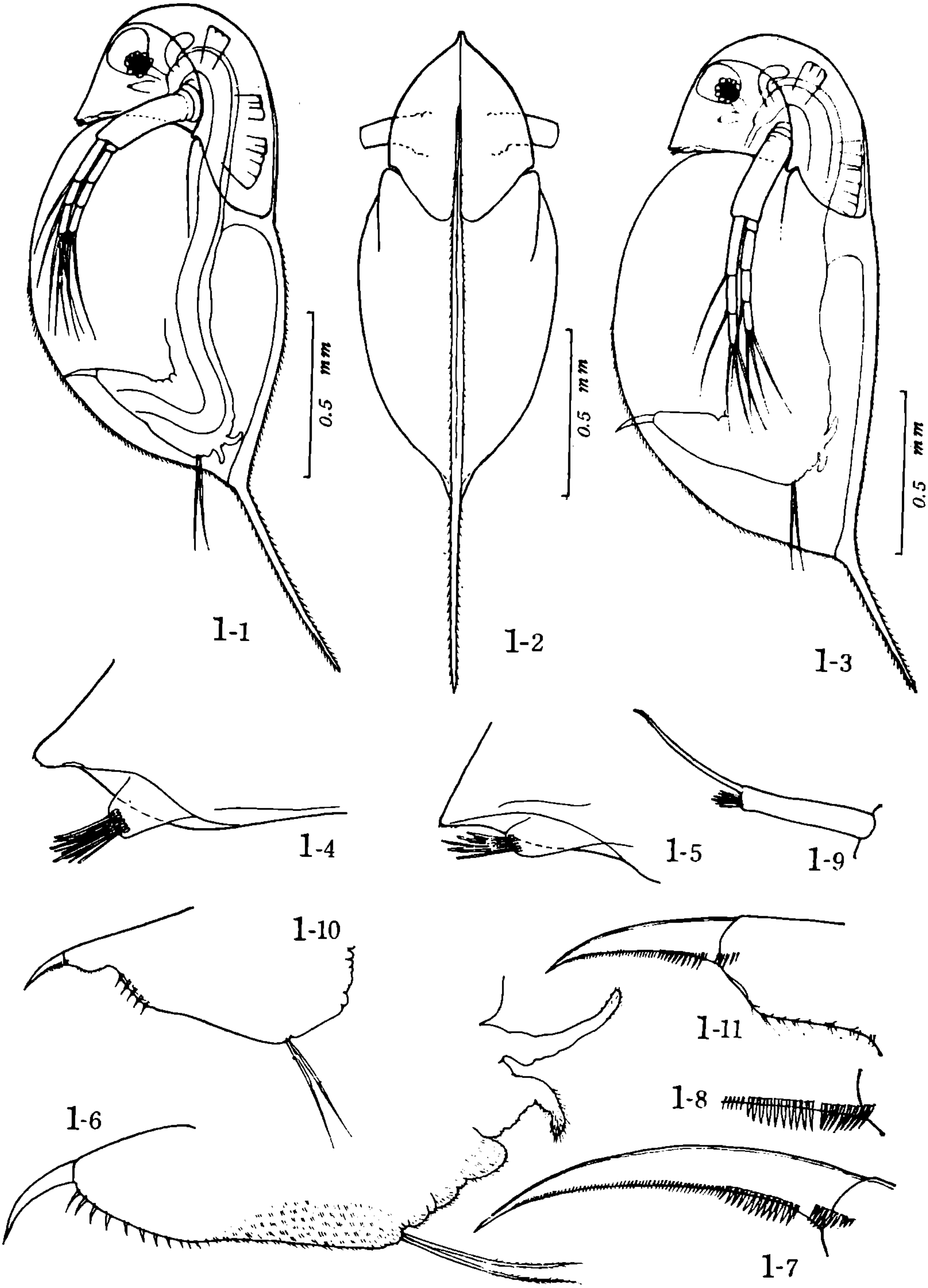

Fig. 1. *Daphnia similis* CLAUS.

1-1, ♀ of loc. no. 2, lateral view ; 1-2, the same, dorsal view ; 1-3, ♀ of loc. no. 3, lateral view ; 1-4, rostrum and antennule of ♀ of loc. no. 3 ; 1-5, rostrum and antennule of ♀ of loc. no. 2 ; 1-6, abreptor of ♀ of loc. no. 3, lateral view ; 1-7, the same, post-abdominal claw, 1-8, basal combs of the other specimen ; 1-9, antennule of ♂ of loc. no. 2 ; 1-10, the same, abreptor ; 1-11, ♂, post-abdominal claw.

and slightly arched dorsally, dorsal ridge developed in medium degree ; shell-spine about half of the length of carapace ; carapace fornix in its least development (Figs. 1-1 and 1-3). The posterior three-fifths of the ventral margin of carapace spinulate.

Intestinal coeca recurved, but not so long and narrow as that illustrated by BROOKS (1957, pl. 2, fig. C, pl. 3, figs. G, E). Anterior antennal muscle attached near vertex of head. First abdominal process longer than the second (BROOKS points out the first slightly longer than the second), apex sparsely covered with hairs ; the second and the third processes thickly hairy or spinulate (Fig. 1-6). Both sides of dorsal margin of abreptor with a row of about 12 relatively small and subequal anal teeth, the proximal end of which is followed by a few groups of minute teeth ; lateral and dorsal surface of abreptor anterior to the row of teeth there is covered with fine spinules in 1-3 groups. Post-abdominal claws relatively short, curved, tapered rapidly toward the end, with 3 sets of fine combs on the dorso-lateral margin (Fig. 1-7), the proximal two especially distinct (Figs. 1-7 and 1-8).

Males smaller than females, 1 mm. or so in length of head and carapace. Ventral margin of head straight, with small and blunt rostrum. Antennules are as shown in Fig. 1-9. Abdominal processes are not well developed (Fig. 1-10) ; posterior margin of abreptor sinuate in lateral view. The opening of vasa deferentia is not apparent, as BROOKS noticed his specimens. Anal teeth only 5, placed laterally ; this feature differs greatly from North American populations which bear 10 to 13 anal teeth. On the rounded part posterior to sinuation there are 6-7 groups of 1-3 fine spinules. Post-abdominal claws short and tapered rapidly as in the female, with 3 sets of combs (Fig. 1-11).

The specimens of both populations are colorless and translucent. In the samples of the loc. no. 2 an ephippium shed from a female was found.

This species is known to be distributed in Eurasia and North America.

2. **Scapholeberis mucronata** (O. F. MÜLLER)

Occurrence : "Shinobazu-ike" (Loc. no. 3).

Only one young female 0.3 mm. in length was found. This specimen is identical with *S. mucronata* in the features of head and long shell-spines (mucrones) (Fig. 2-2 ; cf. RAMMNER 1928, p. 325). RYLOV (1930) recorded *Scapholebris aurita* (S. FISCHER) from a moraine lake in the Alai valley at 3,200 m. above sea level. The present material, though only an individual was found, shows the occurrence of *S. mucronata* in the district south of Pamir. *S. mucronata* was recorded by DADAY (1908) from Tibet (cf. RYLOV, l. c.).

3. **Simocephalus exspinosus** (KOCH)

Occurrence : A pond at Kabul (loc. no. 1).

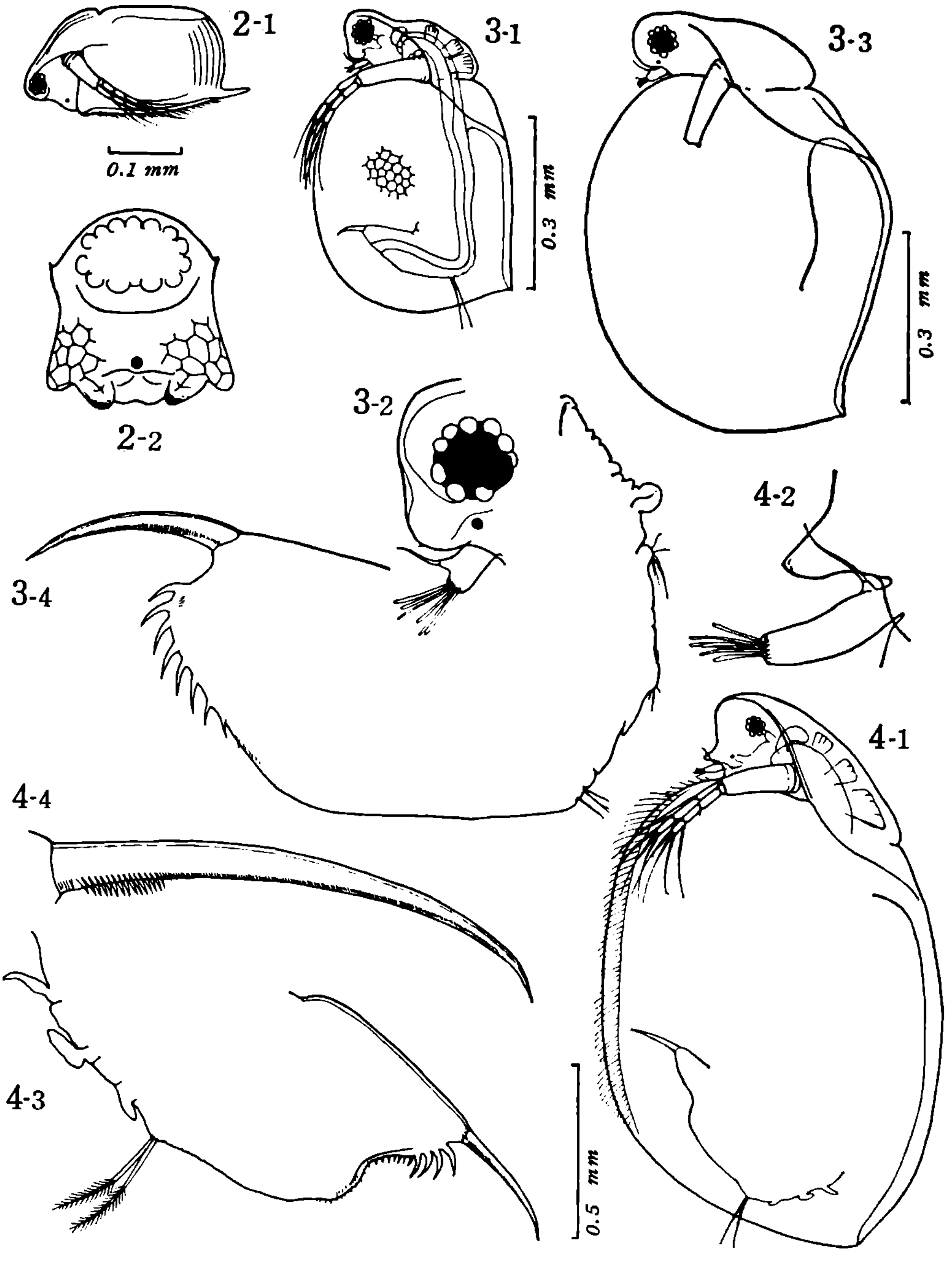

Fig. 2-4.
2-1, *Scapholeberis mucronata* (O. F. MÜLEER), ♀ of loc. no. 3, lateral view ; 2-2, the same, head, ventral view ; 3-1, *Ceriodaphnia laticaudata* P. E. MÜLLER, ♀ of loc. no. 2, lateral view ; 3-2, the same, head, ventral part ; 3-3, ephippial ♀, lateral view ; 3-4, abreptor of ♀, lateral view ; 4-1, *Simocephalus exspinosus* KOCH, ♀ of loc. no. 1, lateral view ; 4-2, rostrum and antennule of the same ; 4-3, abreptor of the same ; 4-4, post-abdominal claw.

Length of head and carapace 1.5 mm. in length. Head small, ventral margin concave, rostrum acute, antennules small (Figs. 4-1 and 4-3). Compound eye relatively small ; ocellus small and rounded rhomboidal. Three small but distinct abdominal processes, of which the first is the longest. Dorsal margin of abreptor bears a row of 4 large anal teeth, the proximal one of which is followed by a row of 7-8 small teeth on the sinuate margin (Fig 4-4). The number of anal teeth in the present specimens is considerably fewer than that of the typical form of *S. exspinosus*. Post-abdominal claws long and curved, with three sets of spinulations, i. e. a row of fine spinules extending to the tip, a basal comb consisting of about 15 teeth and 10 fine teeth proximal to it. No male was found.

WERESTSCHAGIN (1923) and RYLOV (1930) have recorded *S. vetulus* from Pamir, but *S. exspinosus* seems to have unknown in this region. SARS (1903) found this species in "9 different samples from the territory of Akmolinsk" of Central Asia, together with *S. productus* G. O. SARS, *S. vetulus* (O. F. MÜLLER), *S. vetuloides* SARS and *S. mixtus* SARS. The present material from Kabul is nearly related to *S. productus* SARS which was regarded by the author himself as a variety of *S. exspinosus* (SARS 1903, p. 173, pl. VI, fig. 2).

4. **Ceriodaphnia laticaudata** P. E. MÜLLER

Occurrence : A dam near Pagman (loc. no. 2).

This species was found in association with *Daphnia similis* and *Cyclops viridis*. Carapace hyaline, surface reticulated. Head angulate, rounded, antennules not extending beyond the ventral margin of head ; compound eye relatively large. Post-abdomen dilated anterior to the anal region, dorsal margin of abreptor with 8-9 teeth decreasing rapidly in length anteriorly. Abdominal processes not well developed ; the second armed with a few setae and hairs.

Length of females 6-9 mm. There were found a few ephippial females attaining 9 mm. long which already shed their ephippia.

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II. COPEPODA

1. **Cyclops (Acanthocyclops) viridis** JURINE

Occurrence : A dam near Pagman (loc. no. 2) and a pool near Doab (loc. no. 4).

Length of females up to 0.95 mm. (not full mature). Fifth leg 2-jointed, basal joint widened, with a long seta ; second joint small, with a long apical seta and a short spine located subapically (Fig. 5-3). Inner apical seta of endopod of the fourth leg longer than inner seta (Fig. 5-2). Furcal ramus nearly four times

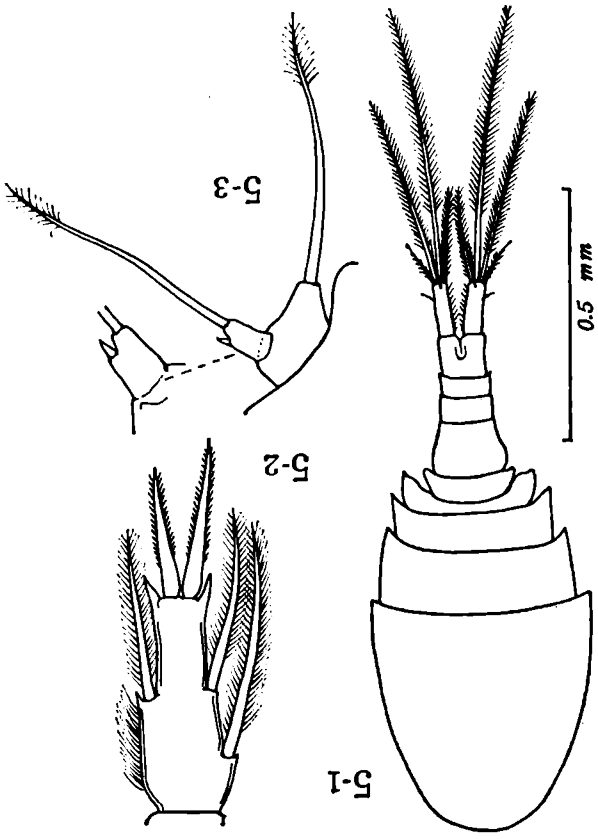

Fig. 5. *Cyclops (Acanthocyclops) viridis* JURINE. 5-1, ♀ of loc. no. 2, dorsal view ; 5-2, endopod of the 4th leg ; 5-3, fifth leg.

as long as wide, inner margin with hairs ; the innermost caudal seta longer than twice the length of the outermost (Fig. 5-1).

Rylov (1930, p. 124) regarded the Pamir form of *Cyclops viridis* as var. *gigas* (CLAUS) which is widely distributed in the Asiatic part of the USSR. The Pagman and Doab materials differ from var. *gigas* which was designated by RYLOV (1948, p. 219) as *Acanthocyclops gigas* (CLAUS).

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III. AMPHIPODA

Gammarus (Rivulogammarus) kuphelectus sp. n.

Occurrence : Lake Shiwa (Shewa), Darwaz, Sept. 9, 1960, 1 ♂ 9 ♀♀. Length ♂ 10 mm., ♀ 9-10 mm.

Body moderately compressed. Eyes moderate, reniform, nearly the same length of the base of the first antenna. First antenna shorter than 1/2 or nearly 1/3 of the length of body and a little longer than second antenna, flagellum composed of 16 joints ; accessory flagellum 3-jointed in the male, the second joint longer than the first, the third vestigial (Fig. 6-2), 2-jointed in the female, the second joint vestigial, with 2 apical setae (Fig. 6-3). Second antenna, peduncle a little longer than flagellum which is composed of 9-10 joints and sparsely setaceous (Fig. 6-1).

Mandibular palp 3-jointed (Fig. 6-8), the second longest and with 5 long setae near distal end, the terminal joint with a row of about 8 bristles on the outer margin and 4 long setae at apex. Second maxilla, both lobes broad, the outer with 4 strong teeth at apex, the inner with 16 plumose setae on inner margin ; palp 2-jointed, the second joint long, with 2 spines and 4 teeth (Fig. 6-9). Hypopharynx with both lobes rounded apically, apical margin with short setae, and prolonged laterally (Fig. 6-10).

Male first gnathopod, palmar joint pyriform (Fig. 6-4), the distal part of inner margin with a row of about 8 spinules, in the proximal end of which there are 2 large spines ; setae rather sparse, especially on the outer margin, inner margin with about 6 groups of long setae ; dactylus strong, with one spine and one seta on the inner margin at 1/3 from the tip. Male second gnathopod, palm

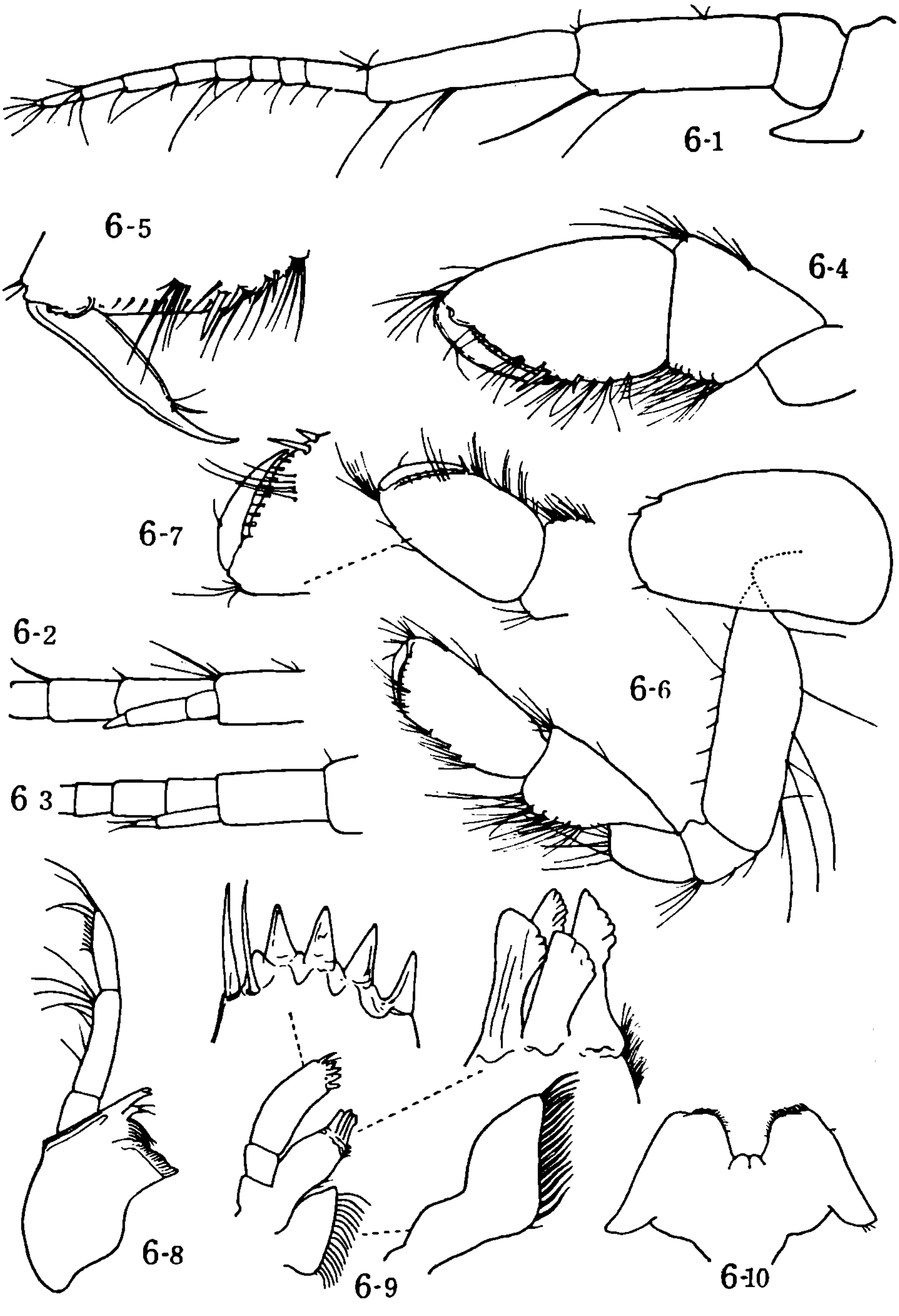

Fig. 6a. *Gammarus (Rivulogammarus) kuphelectus* sp. n. of the locality no. 6.
6-1, second antenna ; 6-2, accessory flagellum of the ♂ first antenna ; 6-3, accessory flagellum of the ♀ first antenna ; 6-4, distal part of the ♂ first gnathopod ; 6-5, the same, palmar part and dactylus ; 6-6, ♀ first gnathopod ; 6-7, palmar part of the ♀ second gnathopod ; 6-8, mandible ; 6-9, second maxilla ; 6-10, hypopharynx.

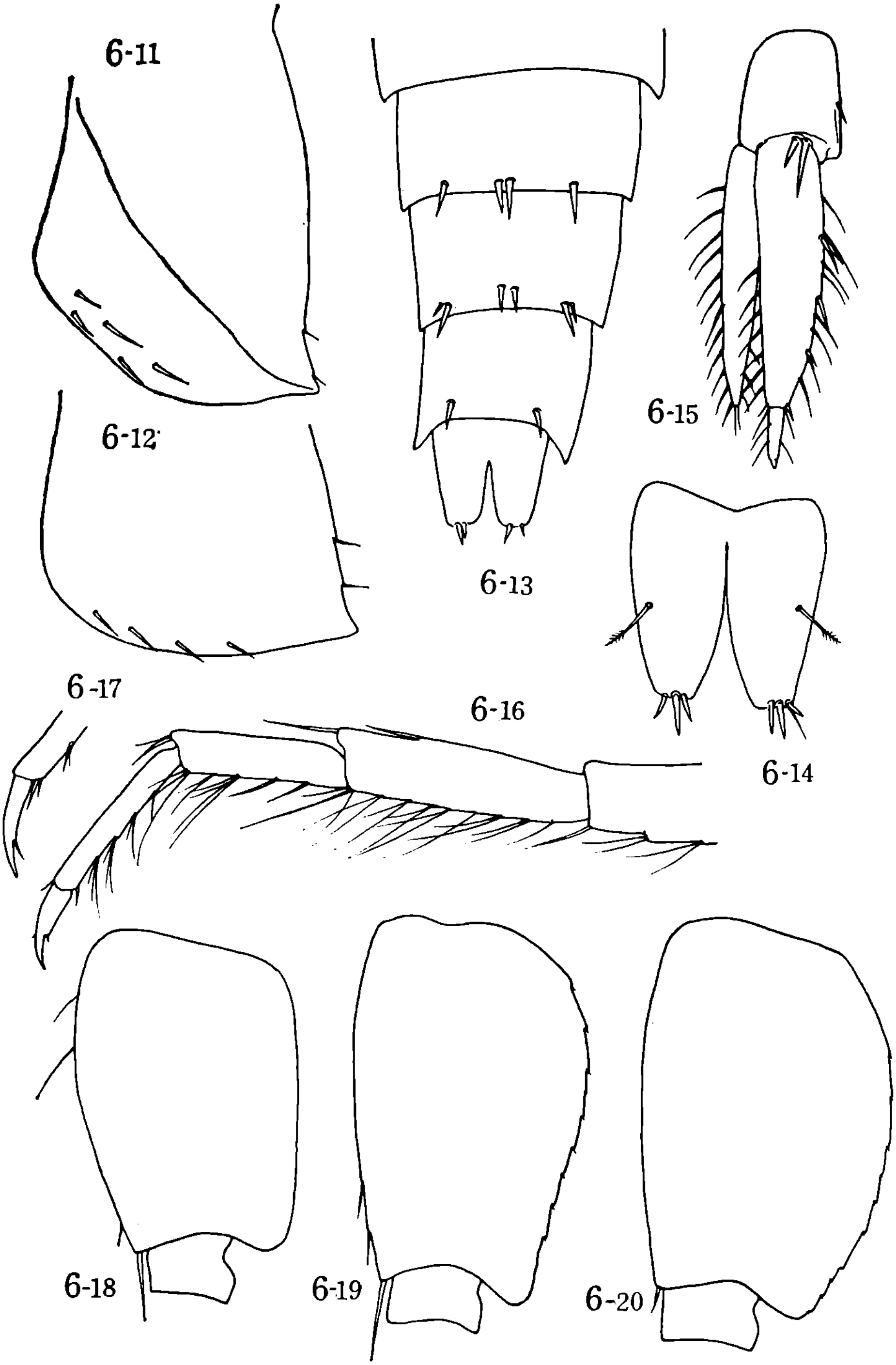

Fig. 6b. *Gammarus (Rivulogammarus) kuphelectus* sp. n. of the locality no. 6.
6–11, left second epimera ; 6–12, left third epimera ; 6–13, urosome somites and telson of ♀, dorsal view ; 6–14, telson of ♂, dorsal view ; 6–15, third uropod ; 6–16, third pereiopod of ♀ ; 6–17, dactylus of the seventh pereiopod ; 6–18, 6–19, 6–20, basipodite of the fifth, sixth and seventh pereiopods of ♀,

somewhat longer and broader than in the first gnathopod, apex obliquely truncate. Female first and second gnathopods, palmar joint much smaller than in the male, the first broader than that of the second, both sparsely setaceous, the distal part of the inner margin with a row of 8-9 spinules as in the male.

Pereiopod 3 fringed with groups of 1-3 long spines and setae on hind margin ; dactylus moderately strong, with one spine on hind margin at 2/3 from the proximal end (Fig. 6-16). Pereiopods 5-7 increase a little in length successively ; second joint (basipodite) of pereiopod 5 oblong, front margin a little convex, with 2 long setae and 1 spine, hind margin nearly straight ; that of pereiopod 6, hind margin arched, distal hind corner somewhat projected, 8 serrations with short spinules, front margin slightly convex, with 2 spines near the distal end ; the second joint of pereiopod 7 subequal to that of pereiopod 6, hind margin much arched than that of the 6th, with about 10 serrations, front margin without spines or setae ; front distal corner of pereiopods 5-7 bears one long spine which is the longest in the 6th and the shortest in the 7th. Branchiae simple sacs, oval in shape.

Metasome somites without spinulation dorsally. Urosome somites armed with spines on each hind margin, arranged as shown in Fig. 6-13 ; the first urosome 1-2-1, the second 2-2-2, and the third 1-0-1 (or, 1-2-1, (1-2)-2-(1-2), (1-2)-0-(1-2)).

The second epimera a little produced at hind corner, with 5 spines on the surface near ventral margin and 2 spines on hind margin near the distal end, no setae. The third epimera also a little produced at hind corner, with 4 spines on the surface along ventral margin and 2 spines on hind margin.

The first uropod, outer ramus 2/3 as long as the inner ramus ; the second uropod, outer ramus 4/5 as long as the inner ramus. The third uropod (Fig. 6-15), peduncle shorter than 1/2 the length of inner ramus ; inner ramus just as long as the basal joint of outer ramus, bearing setae sparsely on both sides and 2 apical setae ; outer ramus with only 4-5 spines and 10 setae on outer margin, 7-8 setae on inner margin, terminal joint nearly 1/5 the length of basal joint, no apical spine or seta.

Telson (Fig. 6-14) deeply cleft ; each lobe narrowed distally, with one dorsal plumose seta and 3 (or 2) apical spines (or 3 apical spines and one seta).

Holotype : 1 male ; paratypes : females.

Remarks : This new species is characterized by the sparsity of setae or seta-groups on the second antennae, the third and fourth pereiopods, on both rami of the third uropod, and also by having 2 (3)-jointed accessory flagellum of the first antenna. Concerning these features, this species seems to be one of the SCHELLENBERG's (1937, p. 275) *balcanicus* group of the sectio *glabra* of the subgenus *Rivulogammarus* KARAMAN. *Gammarus* (*Rivulogammarus*) *balcanicus* SCHÄFERNA (1922, p. 3) has, however, no dorsal spines on the first urosome somite, being represented by three groups of fine setae. Its outer ramus of the third uropod is fringed with plumose setae only on the inner margin. In the sparsity of setae on both rami of the third uropod, the present new species resembles also *G.* (*R.*) *spinulatus* MARTYNOV (1935, p. 456) from Turkestan which belongs to the *balcanicus* group (cf. SCHELLENBERG 1937, p. 275, 1937a, p. 508). Both *G.* (*R.*) *balcanicus* and *G.* (*R.*) *spinulatus* have however the third uropod, inner ramus of which is distinctly shorter than the outer ramus, about 3/4 in the former and 3/5 in the latter species, while in the present new species the inner ramus is just as long as the basal joint of the outer ramus, as in *Carinogammarus aequicauda* MARTYNOV (1931, p. 593). In the feature of the telson the present new species resembles closely *G.* (*R.*) *spinulatus* MARTYNOV and *G. ocellatus* MARTYNOV (from Lake Issyk-kul) as well.

SCHELLNEBERG (1937a, p. 495ff.) has described some Pamir forms of *Gammarus* (*Rivulogammarus*) *lacustris* G. O. SARS on the basis of the REINING's collection, but he has not given such forms as the present species among his *lacustris*. The sparsity of setae on the second antennae of the present species from Lake Shiwa reminds us that of *G. lacustris* whose third pereiopod is however more thickly setaceous than in the present species. The reduction of dorsal spines on the urosome somites particularly the absence of middle spine on the third urosome in the present species shows its close relation to *G.* (*R.*) *lacustris*. The Shiwa specimens may probably be an intermediate form between *G.* (*R.*) *lacustris* and *G.* (*R.*) *pulex*., but they are peculiar in having no middle spine on the palm margin of the male first gnathopod as designated by SCHELLENBERG (1937, p. 270) as a diagnostic character of the sectio *glabra* of *Rivulogammarus*.

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Mayflies (Ephemeroptera) collected by the Kyoto University Pamir-Hindukush Expedition 1960

By

Masuzo UÉNO*

The mayflies in the zoological collections which were made by Dr. Riozo YOSII during the Kyoto University Pamir-Hindukush Expedition 1960 under his leadership are mostly nymphs and subimagines, only a few of them being imagines. The writer who undertook to study them succeeded to distinguish nine species which belong to eight genera. One alpine baëtine form collected on Mt. Noshaq seems to the writer to be a new species, the description of which will be given in the present article.

As far as the present material are concerned, the mayfly fauna of the Pamir-Hindukush border is composed of the elements different from those of Nepal, which have been discussed by the present writer (UÉNO, 1955, p. 314). The mayfly fauna in the district under consideration appears to be made up principally by the Central Asiatic species whose ranges of distribution are confined to Usbekistan and its northeastern districts. It will therefore be said that the present results have made apparent the southward extension of the ranges of distribution of some species.

The writer wishes to express his appreciation to Dr. Riozo YOSII who kindly placed his mayfly collection at the writer's disposal for the present study.

List of the Localities

1. Pagman, 17 June, 1960
   Ameletus alexandrae BRODSKY, 1 nymph; *Baetis* sp., 4 nymphs; *Ephemerella* sp., 3 nymphs.
2. Borak (Barak), 9–10 July, 1960
   Cloeon zimini TSCHERNOVA, 1 ♀ subimago; *Ephemerella* sp., 17 nymphs.
3. Bozghilon (Bazghilon), Kotcha, 14 July, 1960
   Rhithrogena sp., 2 nymphs.
4. Noshaq, 3,800 m. above sea level, 25 July, 1960; on the surface of water of a cold spring by a lake
   Baetis noshaqensis sp. n., 12 ♀♀ imagines, 10 nymphs and 56 exuviae.
5. Noshaq, Quasideh Valley, 3,200 m. adove sea level, 1 August, 1960
   Baetis noshaqensis sp. n., 9 nymphs.

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6. Noshaq, 3,900 m. above sea level, 1 August, 1960
   Epeorus (*Iron*) sp., 5 nymphs.
7. Ishkashim, 29 August, 1960
   Ecdyonurus sp. (a), 16 nymphs; *Ecdyonurus* sp. (b), 20 nymphs; *Epeorus* (*Iron*) sp., 1 full-grown nymph; *Ameletus alexandrae* BRODSKY, 1 nymph.
8. Ishkashim, a pond, 3 September, 1960
   Ameletus alexandrae BRODSKY, 1 nymph.
9. Shiwa Lake (Shewa Lake), Darwaz, 9 September, 1960
   Ameletus alexandrae BRODSKY, 54 ♀♀ subimagines, 1 nymph and 1 exuviae.
10. Doab by Shiwa Lake (Shewa Lake), 10 September, 1960
    Baetis noshaqensis sp. n., 1 nymph.
11. Small stream by Shiwa Lake, 9 September, 1960
    Baetis noshaqensis sp. n., 1 nymph.

List of the Species according to the Taxonomic Arrangement

I. Family: Siphlonuridae

1. Genus: **Ameletus** EATON

1. **Ameletus alexandrae** BRODSKY
   Pagman, 17 June, 1960; Ishkashim, 29 August, 1960; Ishkashim, a pond, 3 September, 1960; Shiwa Lake, 9 September, 1960.

II. Family: Heptageniidae (=Ecdyonuridae)

2. Genus: *Ecdyonurus* EATON

2. **Ecdyonurus** sp. (a)
   Ishkashim, 29 July, 1960; Shiwa Lake, 9 September, 1960; Doab, 10 September, 1960.
3. **Ecdyonurus** sp. (b)
   Ishkashim, 29 July, 1960.

3. Genus: *Epeorus* EATON

4. **Epeorus (Iron)** sp.
   Noshaq, 3,900 m above sea level, 1 Augst, 1960; Ishkashim, 29 July, 1960; Shiwa Lake, 9 September, 1960.

4. Genus: *Rhithrogena* EATON

5. **Rhithrogena** sp.
   Bozghilon, 14 July, 1960.

III. Family: Baetidae

5. Genus: *Baetis* LEACH

6. **Baetis noshaqensis** sp. n.
Pagman, 17 June, 1960; Noshaq, 3,800 m. above sea level, 25 August, 1960; Ishkashim, 29 August, 1960; a small stream by Shiwa Lake, 9 September, 1960; Doab by Shiwa Lake, 10 September, 1960; Ishkashim, 29 August, 1960.

7. **Baetis** sp.
Pagman, 17 June, 1960.

6. Genus: *Cloeon* LEACH

8. **Cloeon zimini** TSCHERNOVA
Borak, 9 July, 1960.

IV. Family: Ephemerellidae

7. Genus: **Ephemerella** WALSH

9. **Ephemerella** sp.
Pagman, 17 June, 1960; Borak, 9-10 July, 1960.

Descriptions and Notes of the Species

1. Ameletus alexandrae BRODSKY

BRODSKY, 1930, p. 697.

Localities: Shiwa Lake, 9 Sept., 1960, 54 subimagines, 1 exuviae, and 1 nymph; Ishkashim, 3 Sept., 1960, 1 nymph, 29 Aug., 1960, 4 nymphs; Pagman, 17 June, 1960, 1 nymph (all the specimens in alcohol).

A large number of subimagines enabled the writer to identify them with BRODSKY's *Ameletus alexandrae* by some features particularly the presence of a distinct black spot (so-called „Ganglion in Form", BRODSKY) on each sternite, though the structure of the forceps of the male genital part were unable to determine. BRODSKY (1930, p. 700) has recorded this species from several places east of Tashkent and as far east as Lake Issyk-Kul. He has also recorded the nymph of this species from Kasakstan and Usbekistan, but the description of it has not been accessible to the writer.

Subimago: Length of body 9.0-9.5 mm., fore-wing 10.0-10.5 mm., caudal filament 7.5 mm. (all in ♀).

Head brownish grey, eyes black. Pronotum grey, frontal margin dark brown. Meso- and metanotum grey. Abdominal tergites greyish brown, hind margin of each tergite dark brown, median line dark brown which becomes paler in posterior tergites; tergites VII-IX dark brown at the sides where they meet with the sternite forming a sharp edge. A round or wedge-shaped black (somewhat reddish) spot present on the sternites III-VIII near the anterior end at the median line, as seen in the imago. Such a blackish spot present also on the ventral

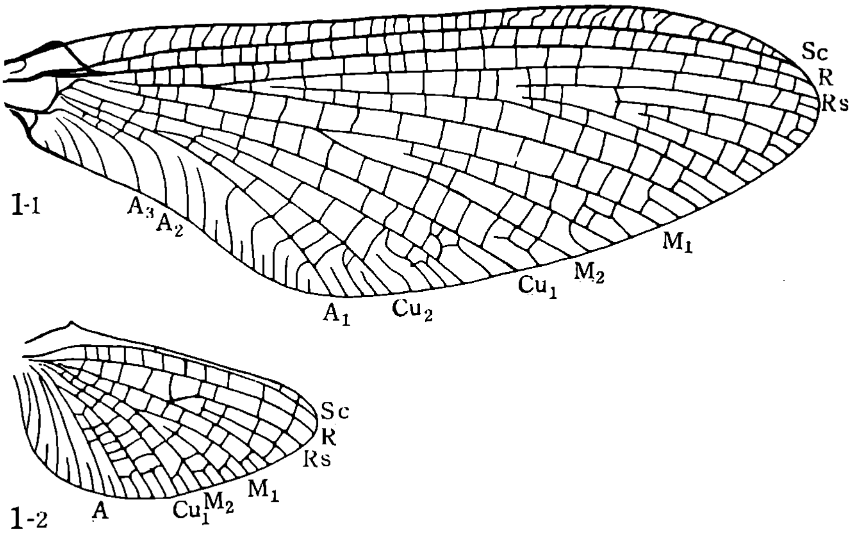

Fig. 1a. *Ameletus alexandrae* BRODSKY, ♀ subimago.
1-1, Fore-wing; 1-2, hind-wing.

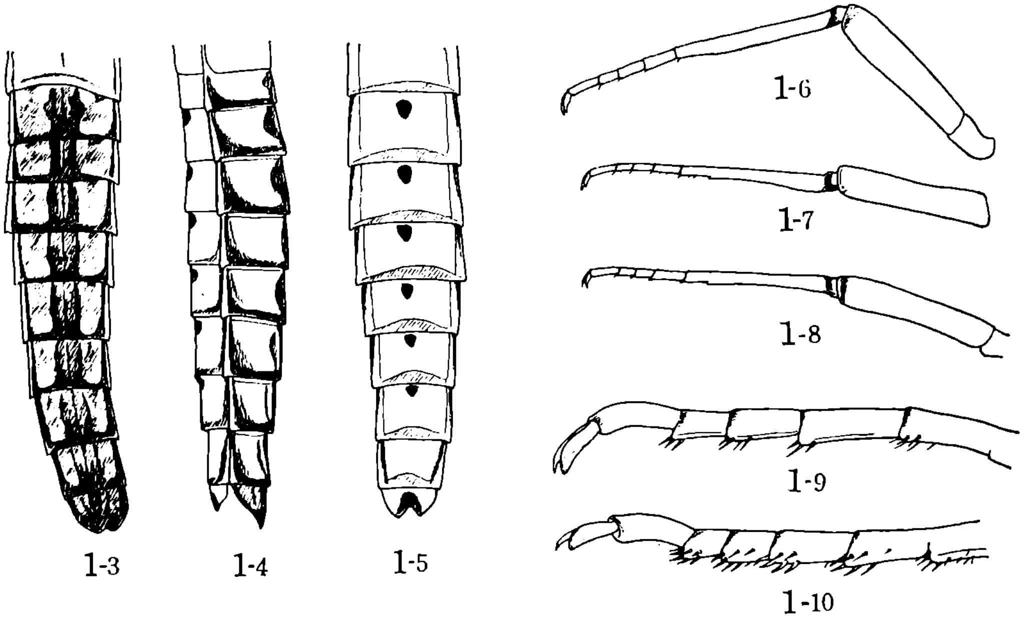

Fig. 1b. *Ameletus alexandrae* BRODSKY, ♀ subimago.
1-3, abdomen, dorsal view; 1-4, abdomen, lateral view; 1-5, abdomen, ventral view; 1-6, fore-leg; 1-7, mid-leg; 1-8, hind-leg; 1-9, tarsus of fore-leg; 1-10, tarsus of hind-leg.

surface of thoracic segments.

The distal end of each femur black. Hind tarsus nearly as long as tibia, with four movable joints, the fifth joint fused to tibia.

Both wings smoked, veins brown; Sc of fore-wing fully visible, Cu_1 and A_1 of fore-wing running parallel to each other at base. The other characters are similar to those of imago given by BRODSKY in his original description.

Nymph:

The Shiwa material consists of only one nymph whose legs, gills and caudal filaments were broken off, but the Ishkashim specimens which were preserved in the complete condition enabled the writer to determine the nymphal characteristics. Length of body 10 mm. in the Shiwa nymph, 8-12 mm. in the Ishkashim nymphs. The length of caudal filaments of the latter measured 4.5-5.5 mm.

Head narrower than pronotum, eyes large, antennae 15-jointed. Pronotum short, both sides rounded. Abdomen tapered to rearward, the tergites somewhat arched dorsally in the middle and flattened at sides where they meet with stern-

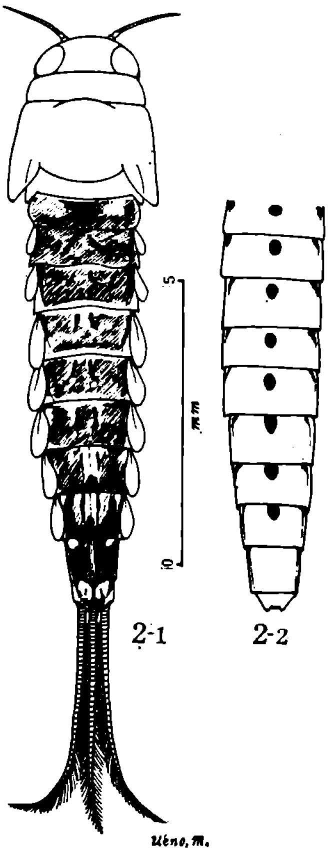

Fig. 2. Nymph of *Ameletus alexandrae* BRODSKY. 2-1, abdomen and caudal filaments, dorsal view; 2-2, abdomen, ventral view.

ites, forming an edge. Tergites brown, with a pair of dark brown stripes present on the tergites II–IX; they are divergent on the tergites II–V, but become parallel on VI–IX. As seen in the imago as well as subimago, there are present narrow dark areas somewhat convergent posteriorly close to lateral sides. On the antero-lateral corners of the tergites VII–IX present a pair of paler areas which becomes larger on the 10th tergite. Sternites brownish yellow, lateral sides brown; on the sternites I–VIII there are present, close to the anterior end, a distinct black spot on the median line; these spots are round in the first two sternites and then become ovoid or wedge-shaped on the posterior sternites. In the subimago such a spot is distinct only on the sternites III–VIII, as described already, but in the nymph they are present also on the sternites I and II. Three caudal filments, half as long as body, yellowish grey, with dark brown rings; laterial filments fringed with fine hairs only on the inner side, while the middle filament with such hairs on both sides.

Gills seven pairs, all simple, oblong-ovate, white, trachea indistinct; the 4th

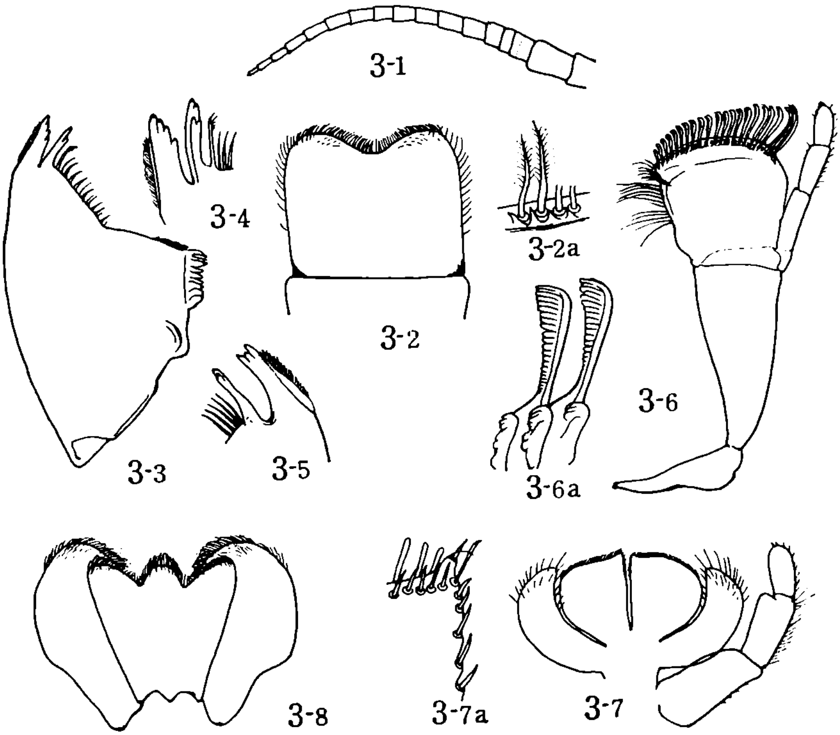

Fig. 3. Nymph of *Ameletus alexandrae* BRODSKY.
3-1, antenna; 3-2, labrum; 3-2a, bristles on the margin of labrum; 3-3. left mandible; 3-4, canine of the same; 3-5, canine of the right mandible; 3-6, maxilla; 3-6a, pectinate spines on the apical margin of galea-lancinia; 3-7, labium; 3-7a, spine arrangement of the inner apical corner of glossa; 3-8, hypopharynx.

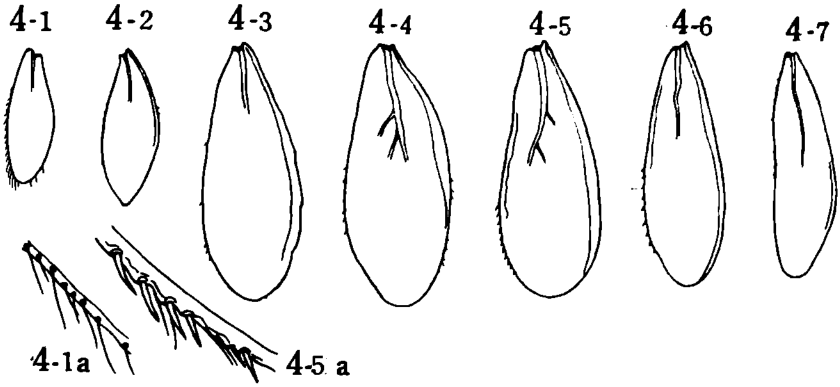

Fig. 4. Nymph of *Ameletus alexandrae* BRODSKY.
4-1~4-7, the first to the seventh gill lamellae; 4-1a and 4-5a, bristles and spines on the margin of the first and the fifth gill lamellae.

longest, 3rd and 5th subequal, the lst slightly longer than half of the 4th; the margin of the lst lamella fringed with long fine setae, but that of the other pairs with both minute spines and setae.

Mouth parts: Labrum wider than long, quadrate, front margin emarginate at middle, beset thickly with fine plumose setae (Fig. 3-1a). Mandibles rather short and robust (Fig. 3-3); canines nearly subequal, outer canine of both mandibles becomes four or three teeth at apex and fringed with fine setae on the outer side; prostheca of right mandible slender, with a few bristles only on the apical inner margin and followed by a row of bristles; left mandible without prostheca, with only a row of bristles. Maxillae (Fig. 3-6) cuneiform, distal margin wide and round, with two rows of long and short comb-like setae (Fig. 3-6a), inner margin with long bristles; maxillary palp extending beyond the distal margin of galea-lacinia. Glossae and paraglossae of labium (Fig. 3-7) nearly equal in length; the former wider than the latter, with inner margin straight, armed with short spinules (Fig. 3-7a); labial palp relatively short and robust. Median part of hypopharynx 3-lobed, lateral lobes rounded apically (Fig. 3-8).

Remarks: The mouth parts of the nymph under consideration show the characteristics of the genus *Ameletus* EATON. The markings on the abdominal tergites and sternites of this nymph, as well as of exuviae, enabled the writer to determine it as of *Ameletus alexandrae* BRODSKY. The present record has made apparent its southward distribution south of Pamir.

2. **Ecdyonurus** sp. (a)

Localities: Only the nymphs were collected. Ishkashim, 29 July, 1960, 16 nymphs; Shiwa Lake, 9 September, 1960, 11 nymphs; Doab, 10 September, 1960, 11 nymphs (all the specimens in alcohol).

Nymph: Length of body 8.0–8.5 mm., median caudal filament 8.0 mm.

This nymph is characterized by having a median dorsal tooth on each tergite. Head large and flattened, widest at the level of anterior portion of eyes, frontal margin rounded, without fringes; general colour brown, frontal portion of the median ocellus pale, a large but inconspicuous pale round median spot present near the frontal margin. Antennae slender, slightly longer than half of the head breadth. Pronotum short, slightly narrower than head, with dilated and rounded lateral margins which are prolonged behind and fused to the sides of mesonotum; colour brown, without distinct markings.

Legs large, pale yellow, with two dark broad bands on the upper surface of flattened femora, one at the proximal end and the other at the distal half and irregular in shape. The length ratio, tarsus: tibia: femur is, in the fore-leg, 1: 3.8: 4.2, mid-leg, 1: 3.2: 3.5; hind-leg, 1: 3.1: 3.3. Femora fringed with a row

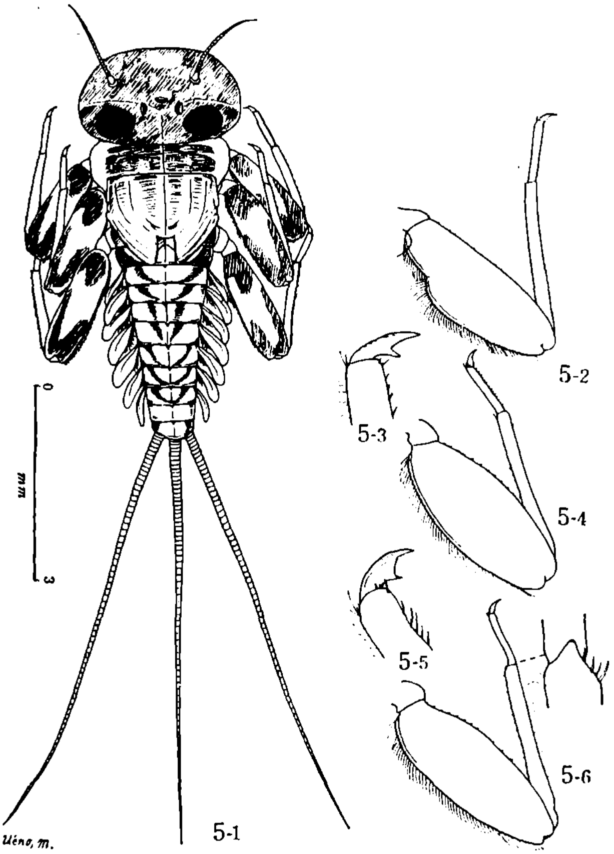

Fig. 5. Nymph of *Ecdyonurus* sp. (a).
5–1, nymph of 6 mm. in body length, dorsal view; 5–2, 5–3 and 5–6, fore–, mid–, and hind-leg; 5–3, claw of mid-leg; 5–5, claw of hind-leg.

of long bristles on the outer margin, with short minute spines on the inner margin, the upper surface covered densely with minute spines; tibiae and tarsi with long bristles on the outer margin and short spines on the inner margin; claws unidentate on the inner margin.

Labrum short and wide, four times as wide as its length, fringed with long bristles on the frontal margin (Fig. 6-1). Mandibles broad in the portion of galea-lacinia, but very slender in the basal half (Figs. 6-2, 6-3). Inner canine of the left mandible nearly as long as the outer canine, with three projections at the tip; inner margin of the outer canine crenated, with about ten blunt teeth, prostheca represented by five long and two short spines. Inner canine of the right mandible 4/5 as long as the outer canine, with about ten crenulations on the inner margin; prostheca composed of three long and two short spines. Molar surface of both mandibles well developed.

Maxillary palp (Fig. 6-4) slender, proximal joint with a row of long bristles on the outer margin, second joint fringed on the outer margin with long setae, and the terminal portion beset thickly with short bristles; galea-lacinia broad,

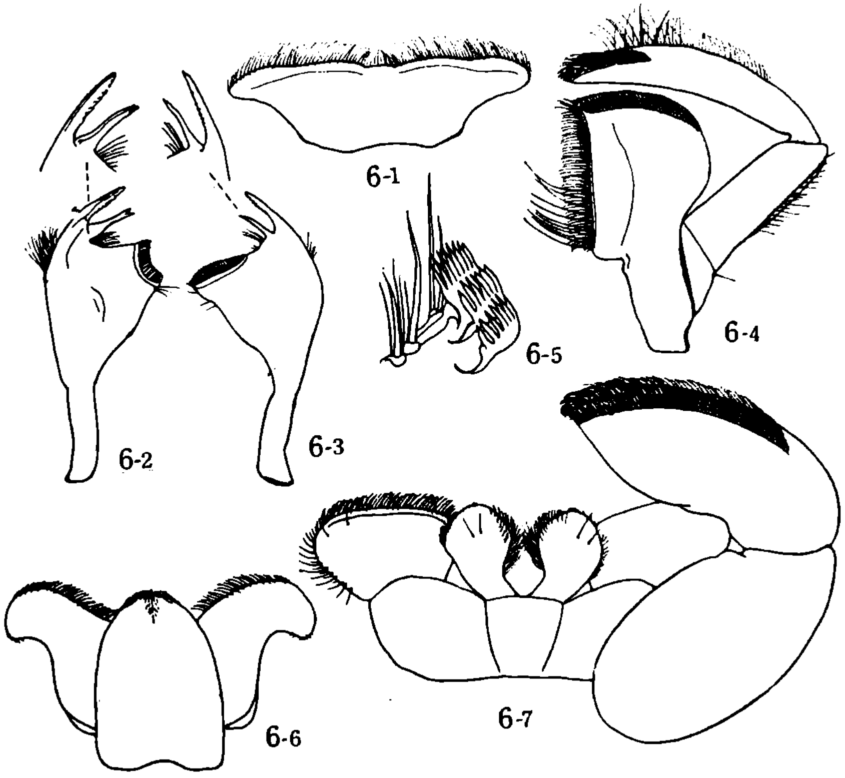

Fig. 6. Nymph of *Ecdyonurus* sp. (a).
6-1, labrum; 6-2, left mandible; 6-3, right mandible; 6-4, maxilla; 6-5, inner apical corner of galea-lacinia of maxilla; 6-6, hypopharynx; 6-7, labium.

inner margin nearly straight, on the apical margin there are two rows of long and short spines (Fig. 6-5), on the inner margin there are also two rows of long and short spines, and on the proximal half a row of about 10-11 long bristles (Fig. 6-5).

Glossae of labium small, slightly divergent apically, apical margin conical, beset thickly with long setae on the intero-apical margin, two long bristles present on the upper surface; paraglossae twice as wide as glossae, fringed thickly with long bristles on the apical margin, and with two rows of bristles; labial palp large and robust, beset thickly with bristles on the outer border of distal 2/3. Median lobe of hypopharynx rounded apically, lateral lobes strongly outcurved, outer margin sinuate, fringed with long bristles on the inner apical margin (Fig. 6-6).

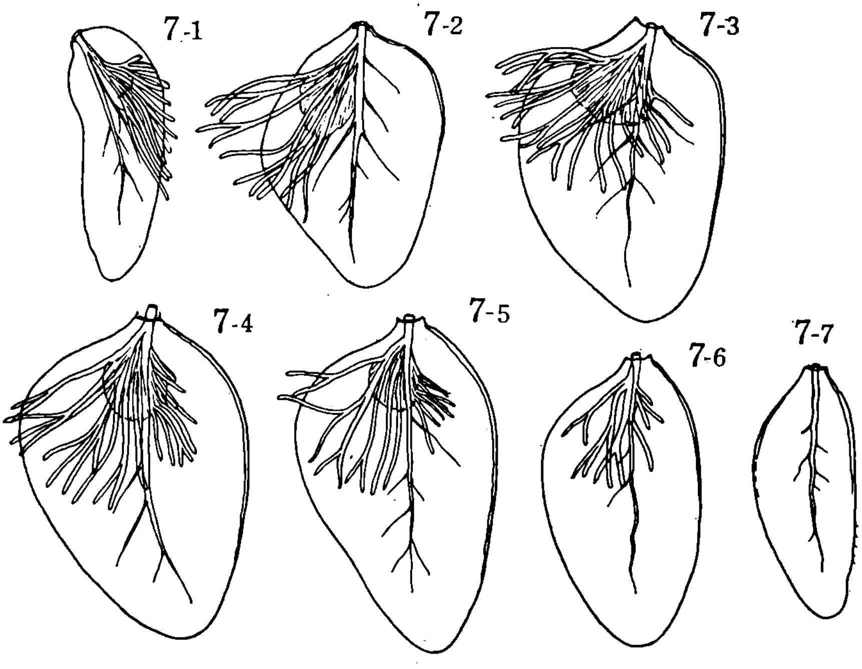

Fig. 7. Nymphal gills of *Ecdyonurus* sp. (a).
7-1~7-7, the first to the seventh gills.

Seven pairs of gills present on the abdominal segments from 1 to 7 (Fig. 5-1), all lamellate, with filamentous gills, except the seventh pair which consists of lamellae only (Fig. 7-7). The first pair of lamellae nearly as long as the seventh lamellae, both lanceolate in outline; lamellae 2 to 6 broadly ovate or obtuse ovate, the fourth lamellae largest, nearly as long as the fifth; third and sixth subequal in length, but the former much broader than the latter.

Ecdyonurus sp. (b)

Locality: Ishkashim, 29 Aug., 1960, 20 nymphs (in alcohol). Length of body

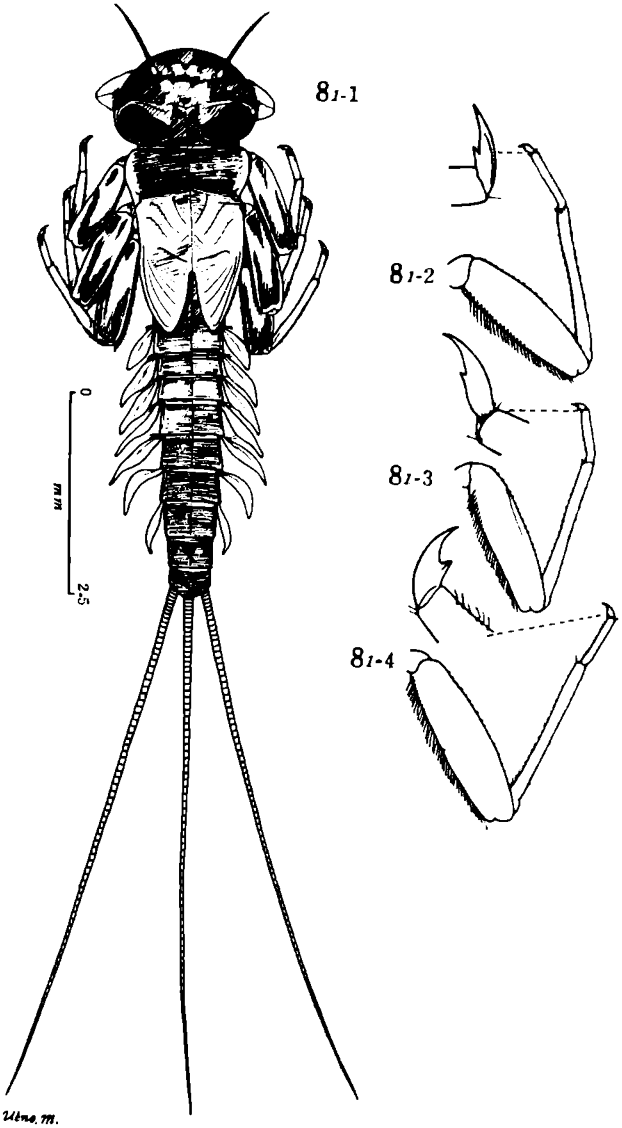

Fig. 8. 1. Nymph of *Ecdyonurus* sp. (b).
8. 1-1, nymph of 7 mm. in body length, dorsal view ;
8. 1-2, fore-leg ; 8. 1-3, mid-leg ; 8. 1-4, hind-leg.

8.0 mm., median caudal filament a little longer than 8.0 mm.

Head large, flattened, 2/3 as long as wide, frontal margin round, without fringes, hind margin slightly concave ; general colour brown, epicranial suture pale, two series of pale spots present, the one consisting of indistinct three spots in front of the median ocellus and the other four of nearly equal size between the bases of antennae. Besides these, one more indistinct pale median spot present close to the frontal margin. Seen from above, the maxillary palps protruded as elbows beyond the lateral margins of head (Fig. 8-1).

Pronotum a little narrower than head, lateral margins rounded, posterior prolongations fused to mesonotum at the sides, no distinct dark patterns on the surface.

Abdomen uniformly brown, without markings, except the ninth which has dark longitudinal stripes at median line and both sides; no tooth on the hind margin of each tergite, as seen in *Ecdyonurus* sp. (a) described before. Three caudal filaments, slightly longer than body, brown in colour.

Legs pale yellow, with two irregular dark brown cross bands on the femora of all legs (Fig. 8.1-1). Distal end of tibiae also with a dark brown band. The length ratio, tarsus: tibia: femur, is: in fore-leg, 1: 2.5: 2.5, mid-leg, 1: 2.9: 2.9, and hind-leg, 1: 3.2: 3.2; claws bear one tooth at the middle of inner margin. All femora fringed with long bristles on the outer margin; inner margins of all tibiae with short spines (Figs. 8. 1-2, 3, 4).

Labrum short and wide, fan-shaped, frontal margin rounded, fringed closely with setae (Fig. 8. 2-1). Mandibles broad in the portion of galea-lacinia and slender in the basal half (Figs. 8. 2-2, 8. 2-3). Inner canine of the left mandible

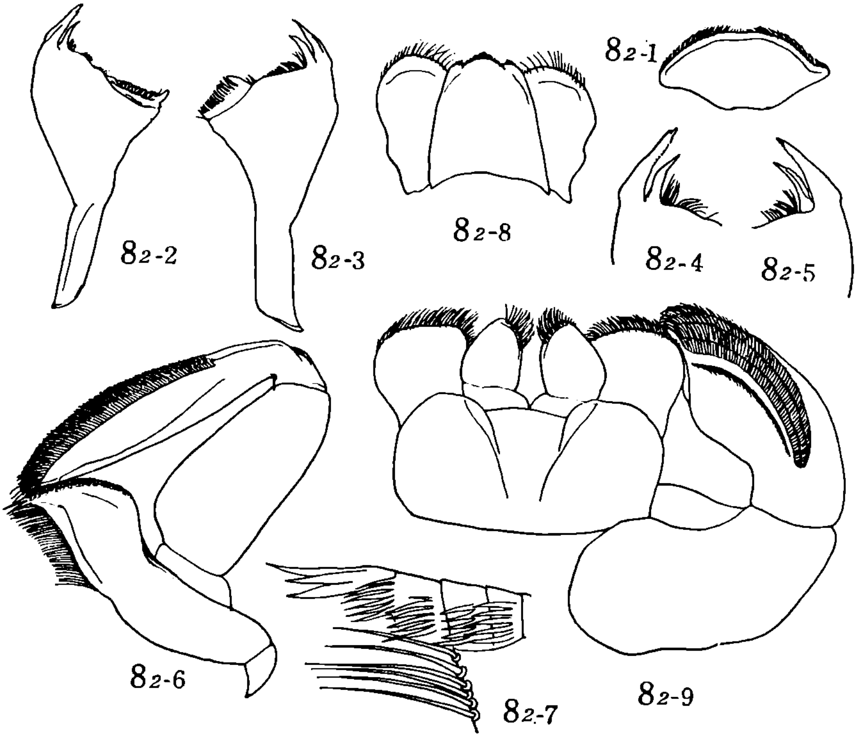

Fig. 8. 2. Nymphal mouth parts of *Ecdyonurus* sp. (b).
8. 2-1, labrum; 8. 2-2, left mandible; 8. 2-3, right mandible; 8. 2-4 and 8. 2-5, canines of the left and the right mandibles; 8. 2-6, maxilla; 8. 2-7, inner apical corner of galea-lacinia of maxilla; 8. 2-8, hypopharynx; 8. 2-9, labium,

nearly 2/3 as long as the outer one (Fig. 8. 2-4); inner margin of the outer canine with shallow crenulations; prostheca is represented by a row of long spines. Inner canine of the right mandible about 4/5 as long as the outer canine; prostheca represented by long spines.

Apical margin of maxillary galea-lacinia covered with three or four rows of combs which are composed of five or six spines (Fig. 8. 2-7); inner apical corner armed with three large processes directed inwards; inner margin fringed with a row of long bristles (Fig. 8. 2-7). Glossae of labium small, separated at the base, inner apical margin fringed with long setae; paraglossae 1.5 times as wide as glossae, apical margin fringed. Median lobe of hypopharynx trilobate, each lobe rounded, fringed with short setae; lateral lobes not out-curved as in *Ecdyonurus* sp. (a), outer margin slightly longer than body, brown in colour.

Seven pairs of gills present on the abdominal segments I-VII (Fig. 8. 1-1); all lamellate, with 1-3 filamentous gills, except the last two pairs which consist of lamellae only; first, sixth and seventh as long as each other, but the first much broader than the other two, cordate in form; the third and the fourth the largest, obtuse ovate; outer margin of all lamellae more or less thickened and fringed sparsely with short spines or bristles (Figs. 8. 3-1∼7).

Remarks: This nymph probably belongs to the genus *Ecdyonurus* in the feature of pronotum, lateral margins of which are prolonged backwards and fused to the mesonotum. Of the mouth parts, the structure of the lateral lobes of hypo-

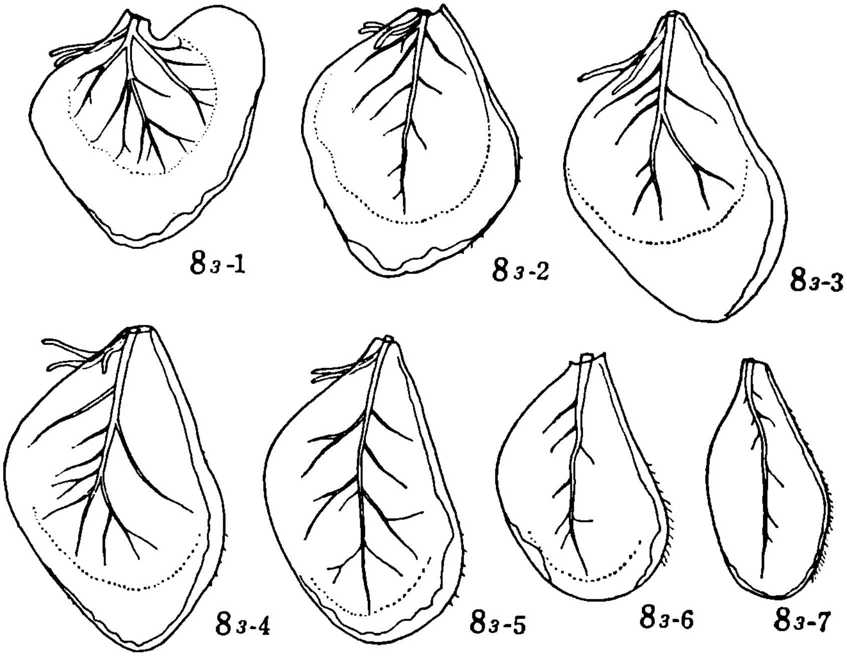

Fig. 8. 3. Nymphal gillis of *Ecdyonurus* sp. (b).
8. 3-1∼8. 3-7, the first to the seventh gills, anterior view.

pharynx differ from those of the typical *Ecdyonurus* nymph, in having the outer lobes, outer margins of which are slightly sinuate. This feature may indicate the presence of a peculiar shape of hypopharynx among the nymphs of the genus *Ecdyonurus*. The queer apperance of head seen from above, i. e. the maxillary palps are protruded on both sides beyond the lateral margins of head, were seen not only in younger but also in older stages of all the specimens examined.

4. **Epeorus (Iron)** sp.

Localities: Ishkashim, 29 July, 1960, 1 nymph; Noshaq, 3,900 m. above sea level, 1 Aug., 1960, 5 nymphs; Shiwa Lake, 9 Sept., 1960, 5 nymphs (all in alcohol).

Length of body 6.0–8.5 mm., caudal filaments up to 8.5 mm. (Shiwa specimens); body 12.5 mm., caudal filaments 15 mm. (a Ishkashim specimen).

Head large and flattened, a little narrower than twice of head length, all the margins rounded, frontal margin fringed thickly with setae; compound eyes apart from the lateral margins; general colour brown, with dark brown patterns between the bases of antennae, compound eyes, and around the median ocellus (Fig. 9. 1–1); more indistinct and irregular patterns also present near the frontal margin and the outside of compound eyes. Pronotum short, lateral margins rounded, brown, with dark markings along the hind margin.

Legs relatively large; besides a row of bristles on the outer margin of each femur, there is a row of long setae on the inner margin of each tibia; claws rather large and acuminate, with no tooth on the inner margin, only in the claw of hind-leg present a few hardly visible crenulations. The length ratio, tarsus : tibia : femur, is : in fore-leg, 1 : 3.2 : 2.8; mid-leg, 1 : 3.8 : 3.7; hid-leg, 1 : 3.7 : 4.3. Femur of hind-leg is 4/5 as long as that of fore-leg. Two caudal filaments, a little longer than body.

Labrum (Fig. 9. 1–2) small, about 2.5 times as wide as its length, a shallow excavation on the frontal margin, antero-lateral margins rounded. The arrangement of spines and bristles along the margin is shown in Fig. 9. 1–3. There is a row of more than 25 short bristles on the front margin extending to lateral margins on both sides; besides these, 4 spines, 2 short and 2 long, at the median portion, and one long spine at either side of the median group, two more spines at the antero-lateral corner and three long ones on the lateral margin.

Mandibles slender, galea-lacinia portion broad (Figs. 9. 1–4, 9. 1–7); inner canine of left mandible about 2/3 as long as the outer canine, apex trifid and bears seven teeth on the outer margin; outer canine with three apical crenulations which are followed by five small crenulations on the inner margin; prostheca is represented by a row of about eight long setae (Fig. 9. 5–5). Outer canine of right mandible (Fig. 9. 1–8) with nine deep crenulations on the inner margin, inner canine nearly 1/2 of the outer canine, with about nine deep crenulations on the outer margin, apex dipartite, each part of which forms three

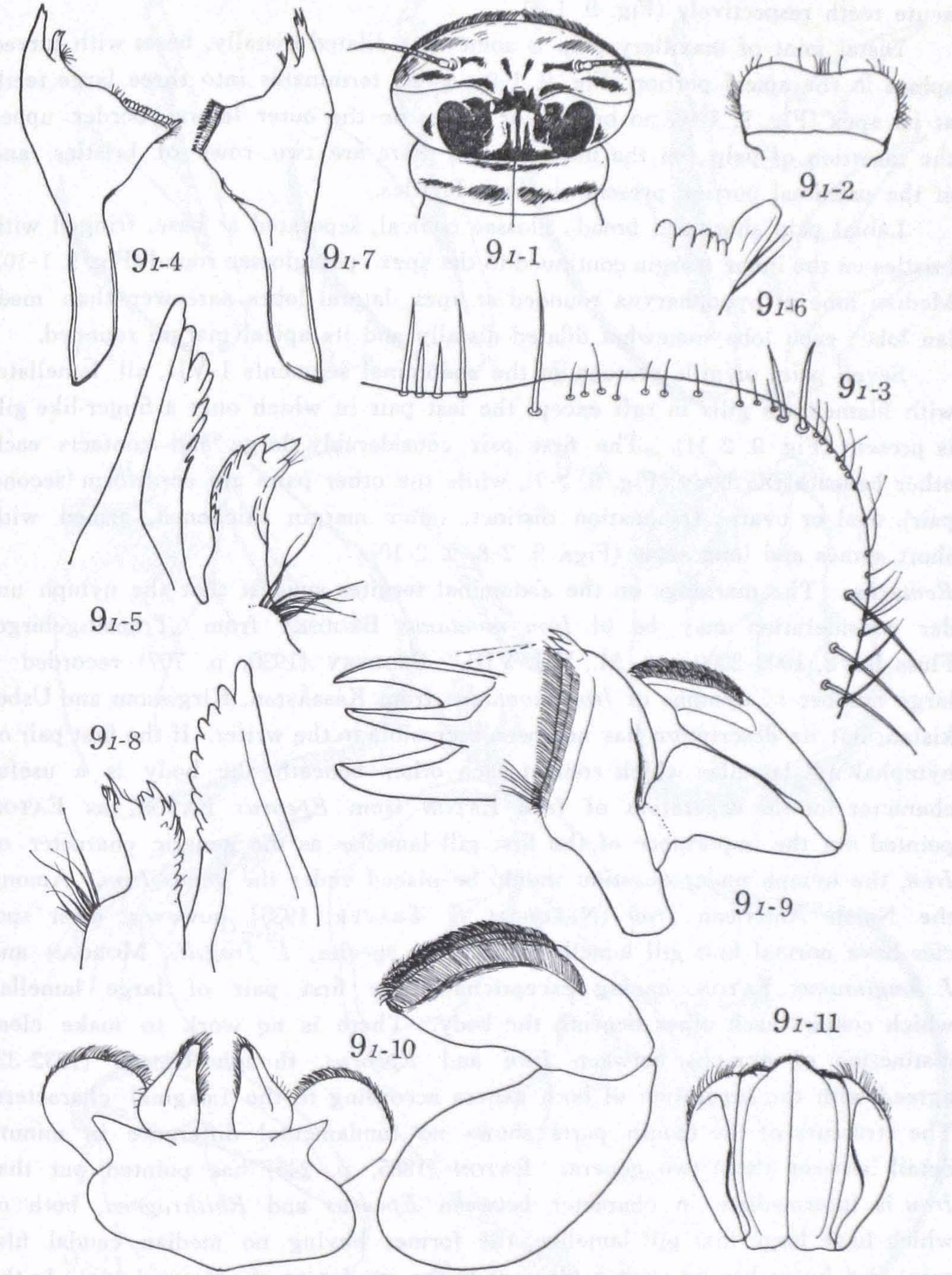

Fig. 9. 1. Nymph of *Epeorus (Iron)* sp.
9. 1–1, head and pronotum, dorsal view; 9. 1–2, labrum; 9. 1–3, right half of the anterior part of labrum, dorsal view; 9. 1–4, left mandible; 9. 1–5, canine area of the left mandible; 9. 1–6, inner end of the molar of the same; 9. 1–7, right mandible; 9. 1–8 canine area of the same; 9. 1–9, maxilla; 9. 1–10, labium; 9. 1–11, hypopharynx.

acute teeth respectively (Fig. 9. 1-8).

Distal joint of maxillary palp is somewhat dilated distally, beset with curved spines in the apical portion (Fig. 9. 1-9); galea terminates into three large teeth at its apex (Fig. 9. 1-9), no bristles or spines on the outer lateral border upper the insertion of palp; on the inner margin there are two rows of bristles, and at the proximal portion present six long bristles.

Labial palp short and broad; glossae conical, separated at base, fringed with bristles on the inner margin continued to the apex; paraglossae round (Fig. 9. 1-10). Median lobe of hypopharynx rounded at apex, lateral lobes narrower than median lobe; each lobe somewhat dilated distally and its apical margin rounded.

Seven pairs of gills present on the abdominal segments I-VII, all lamellate, with filamentous gills in tuft except the last pair in which only a finger-like gill is present (Fig. 9. 2-11). The first pair considerably large and contacts each other beneath the body (Fig. 9. 2-7), while the other pairs are cordiform (second pair), oval or ovate; tracheation distinct, outer margin thickened, armed with short spines and long setae (Figs. 9. 2-8, 9. 2-10).

Remarks: The markings on the abdominal tergites suggest that the nymph under consideration may be of *Iron montanus* BRODSKY from „Transiligebirge, Fluss Issyk, 1000-2000 m ü. M., VII.-VIII.“ BRODSKY (1930, p. 707) recorded a large number of nymphs of *Iron montanus* from Kasakstan, Kirgisstan and Usbekistan, but its description has not been accessible to the writer. If the first pair of nymphal gill lamellae which contact each other beneath the body is a useful character for the separation of *Iron* EATON from *Epeorus* EATON, as EATON pointed out the importance of the first gill lamellae as the generic character of *Iron*, the nymph under question should be placed under the genus *Iron*. Among the North American *Iron* (NEEDHAM & TRAVER, 1935), however, most species have normal first gill lamellae, only two species, *I. fragilis* MORGAN and *I. longimanus* EATON, having exceptionally the first pair of large lamellae which contact each other beneath the body. There is no work to make clear distinction of nymphs between *Iron* and *Epeorus*, though ULMER (1932-33) agreed with the separation of both genera according to the imaginal characters. The structure of the mouth parts shows no fundamental difference in minute detail between these two genera. EATON (1885, p. 245) has pointed out that *Iron* is intermediate in character between *Epeorus* and *Rhithrogena*, both of which have large first gill lamellae, the former having no median caudal filament and latter having such a filament in the specimens of advanced age. In the nymph of *Iron* the median caudal filament is quite absent in the specimens of advanced age. IMANISHI (1940), who made careful studies of Heptageniidae (Ecdyonuridae) of Japan and continental Asia, placed all the species hitherto ascribed to *Iron* in the genus *Epeorus*. The writer should like to retain *Iron* as a subgenus of the genus *Epeorus*, as designated by EDMUNDS and TRAVER (1954).

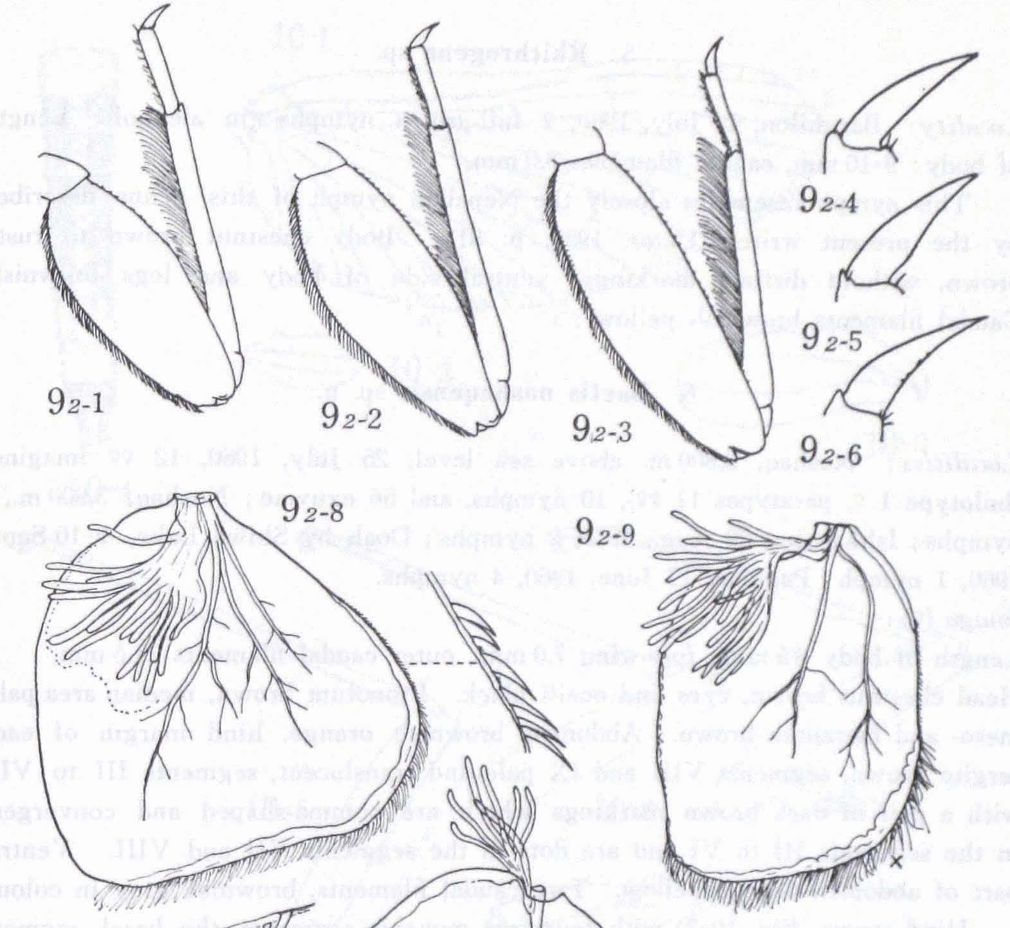

Fig. 9. 2. Nymphal parts of *Epeorus (Iron)* sp.
9. 2–1, fore-leg ; 9. 2–2, mid-leg ; 9. 2–3, hid-leg ; 9. 2–3, 9. 2–4, and 9. 2–5, claws of of fore-, mid-, and hind-leg ; 9. 2–7, left first gill ; 9. 2–8. left second gill ; 9. 2–9, left fourth gill ; 9. 2–10, fringes on the margin of the same ; 9. 2–11, left seventh gill

5. **Rhithrogena** sp.

Locality: Bazghilon, 14 July, 1960, 2 full-grown nymphs (in alcohol). Length of body: 9-10 mm, caudal filaments 8.0 mm.

This nymph resembles closely the Nepalian nymph of this genus described by the present writer (UÉNO, 1955, p. 312). Body chestnut brown to rusty brown, without distinct markings; ventral side of body and legs brownish. Caudal filaments brownish yellow.

6. **Baetis noshaqensis** sp. n.

Localities: Noshaq, 3,800 m. above sea level, 25 July, 1960, 12 ♀♀ imagines (holotype 1 ♀, paratypes 11 ♀♀), 10 nymphs, and 56 exuviae; Noshaq, 3,900 m., 9 nymphs; Ishkashim, 29 Aug., 1960, 2 nymphs; Doab by Shiwa Lake, 9-10 Sept., 1960, 1 nymph; Pagman, 17 June, 1960, 4 nymphs.

Imago (♀):

Length of body 8.5 mm., fore-wing 7.0 mm., outer caudal filaments 11.5 mm. Head chestnut brown, eyes and ocelli black. Pronotum brown, median area pale, meso- and metanota brown. Abdomen brownish orange, hind margin of each tergite brown, segments VIII and IX pale and translucent, segments III to VIII with a pair of dark brown markings which are comma-shaped and convergent in the segments III to VI and are dots in the segments VII and VIII. Ventral part of abdomen orange yellow. Two caudal filaments, brownish grey in colour.

Hind tarsus (Fig. 10-7) with four free movable segments, the basal segment being more or less fused to the tibia; claws dissimilar (Fig. 10-8).

Wings hyaline, veins blackish brown. Fore-wing (Fig. 10-1), costal and subcostal area smoked; M not forked, simple, intercalary veins arranged in pairs. Hind-wing (Fig. 10-2, 10-3) small, 1/5 as long as fore-wing, oval in shape, with a bluntly pointed process on costal margin, and with only two longitudinal unforked veins.

No male was taken in the localities mentioned above. The length of body of the paratypes is 6.0-8.0 mm., the length of caudal filaments of the same is 9.5-11.0 mm. In the type locality (Noshaq, 3,800 m.), the just emerged females were found floating on the surface of water of a cold spring together with a large number of exuviae.

Remarks: Although the male of this new species is unknown, the female shows some characteristics different from the known species, i. e. the markings on the abdominal segments, smoked costal and subcostal area of the fore-wing, and small hind wings which have only two longitudinal veins. In the last character the present new species resembles closely *Baetis sumatrana* ULMER (1939, p. 524) which has also two longitudinal veins only, but the latter species is hardly 5 mm.

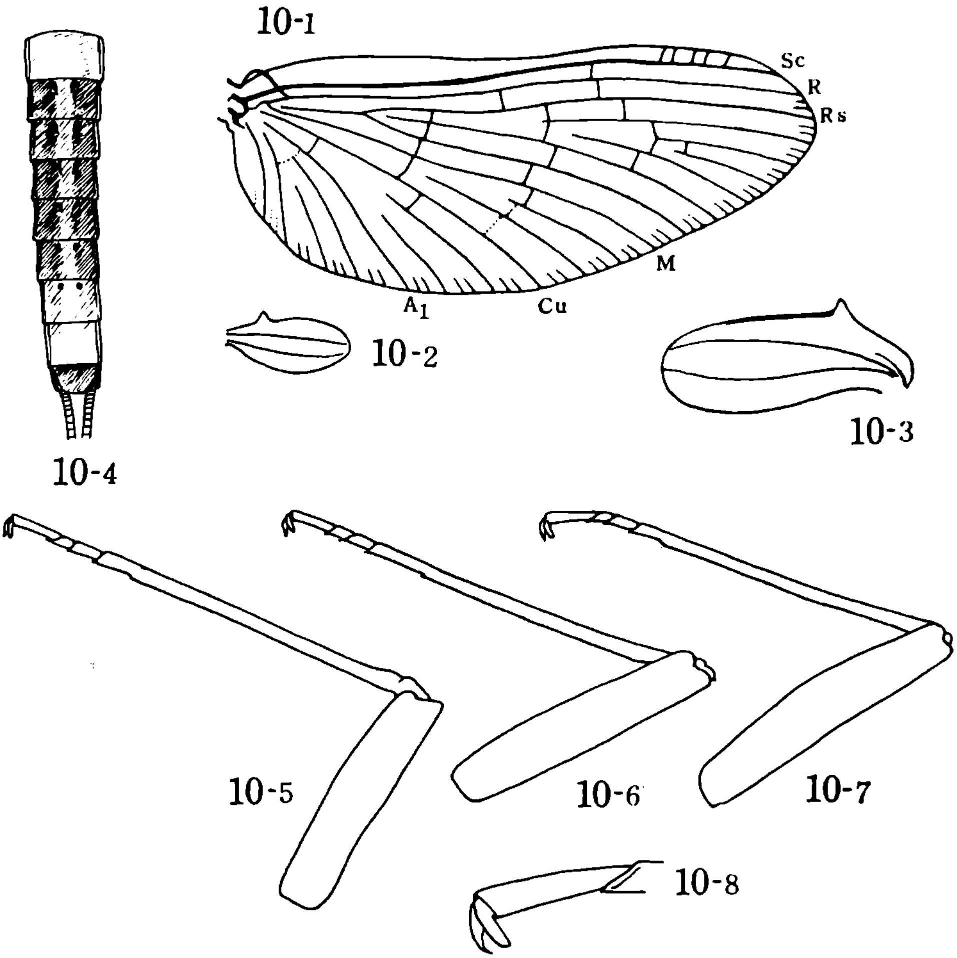

Fig. 10. *Baetis noshaqensis* sp. n., ♀ imago.
10-1 and 10-2, fore- and hind-wings; 10-3, hind-wing, enlarged; 10-4, abdomen, dorsal view; 10-5, 10-6 and 10-7, fore-, mid-, and hind-legs; 10-8, claws of hind-leg.

in length. In the neighbouring districts of the above-cited localities, *Baetis heptapotamicus* BRODSKY (1930) is known from the Talassmountain (Akssu stream), but this species is 7 mm. in length in the male and its hind-wings have three longitudinal veins. Taking the nymphal characters together, the Noshaq specimens seem to belong to a new species of the genus *Baetis*.

Nymph (full-grown) (Fig. 11):

Length of body 8.0 mm., outer caudal filaments 6.0 mm.

Body cylindrical, brown in colour. Head nearly as wide as the posterior margin of pronotum, directed downward, brown, both sides of median line dark brown; three ocelli; antennae 2/5 as long as body. Pronotum a little widened posteriorly, dark brown, median line pale; meso- and metanotum dark brown, wing-pads blackish brown.

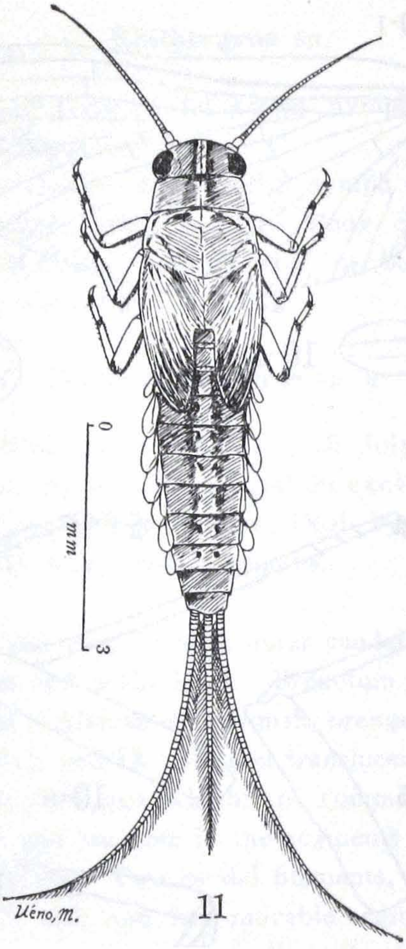

Fig. 11. *Baetis noshaqensis* sp. n.,
Nymph of 6 mm. in body length, dorsal view.

Legs slender, olive brown, distal end of each segment becomes darker; hind-leg the longest and the fore-leg the shortest, tibiae of all legs are the same length, and the tarsi and femora increase slightly in length successively, as seen in the ratio, tarsus : tibia : femur, as, in fore-leg, 1 : 2.4 : 2.3; mid-leg, 1 : 2.4 : 2.6; and hind-leg, 1 : 2.4 : 2.6. Femora fringed with a row of bristles on the outer margin; both margins of tibiae and tarsi with short spines and bristles; claws rather large, curved, with nine small teeth on the inner margin (Figs. 13-4, 13-5).

Abdominal segments tapered rearward, tergites brown, both sides of median line with dark longitudinal bands and a pair of dark brown dot-markings, as seen in the female imago, except the tergites IX and X (Fig. 11). Ventral side of thorax and abdomen somewhat paler than dorsal side. Three caudal filaments, median one shorter than the outer ones, olive brown, outer filaments fringed

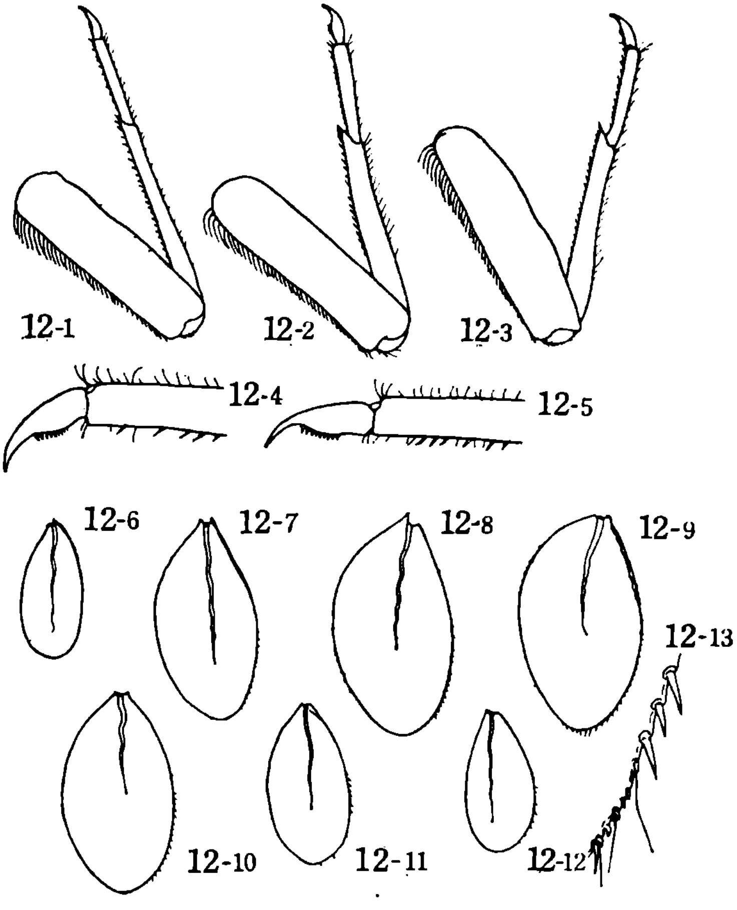

Fig. 12. Nymphal legs and gills of *Baetis noshaqensis* sp. n. 12-1, fore-leg; 12-2, mid-leg; 12-3, hind-leg; 12-4, claw of mid-leg; 12-5, claw of hind-leg; 12-6~12-12, the first to seventh gill lamellae; 12-13, spines and denticles on the margin of gill.

with only on the inner side.

Seven pairs of gills present on the abdominal segments I to VII, all simple, lamellate, ovate in shape, translucent; the first pair is the smallest, about 3/5 of the largest fourth (Figs. 13-6~13-12); the length order is, 3 and 4>5, 2>6>7>1; tracheation indistinct, only a main trachea visible; outer margin armed with short spines and fine setae (Fig. 13-13).

Labrum (Figs. 13-1, 13-2) rather large, oblong, twice as wide as long, with a shallow median notch on the rounded apical margin; a row of numerous bristles present just inside the apical margin and on the lateral margin; on the upper surface near the anterior margin there is a transverse row of stouter and longer bristles, about twelve in total number, which reaches the lateral margin on each side. The upper surface of the right half of the labrum is illustrated in Fig. 13-2.

Mandibles (Fig. 13-3) robust and pyramidal shape. Outer canine bears five teeth in the left mandible and two (three) in the right; inner canine has four teeth in the left and three (four) in the right mandibles (Figs. 13-4, 13-5); prostheca of the left mandible bears about five acuminate teeth and one long spine on its inner apical margin (Fig. 13-4), while prostheca of the right mandible bears 7-8 large acuminate teeth on the inner apical margin (Fig. 13-5).

Maxillary palp a little longer than galea-lacinia, three-jointed, the terminal joint the longest; galea-lacinia bears three terminal teeth and two rows of long and short bristles on the apical margin (Fig. 13-6).

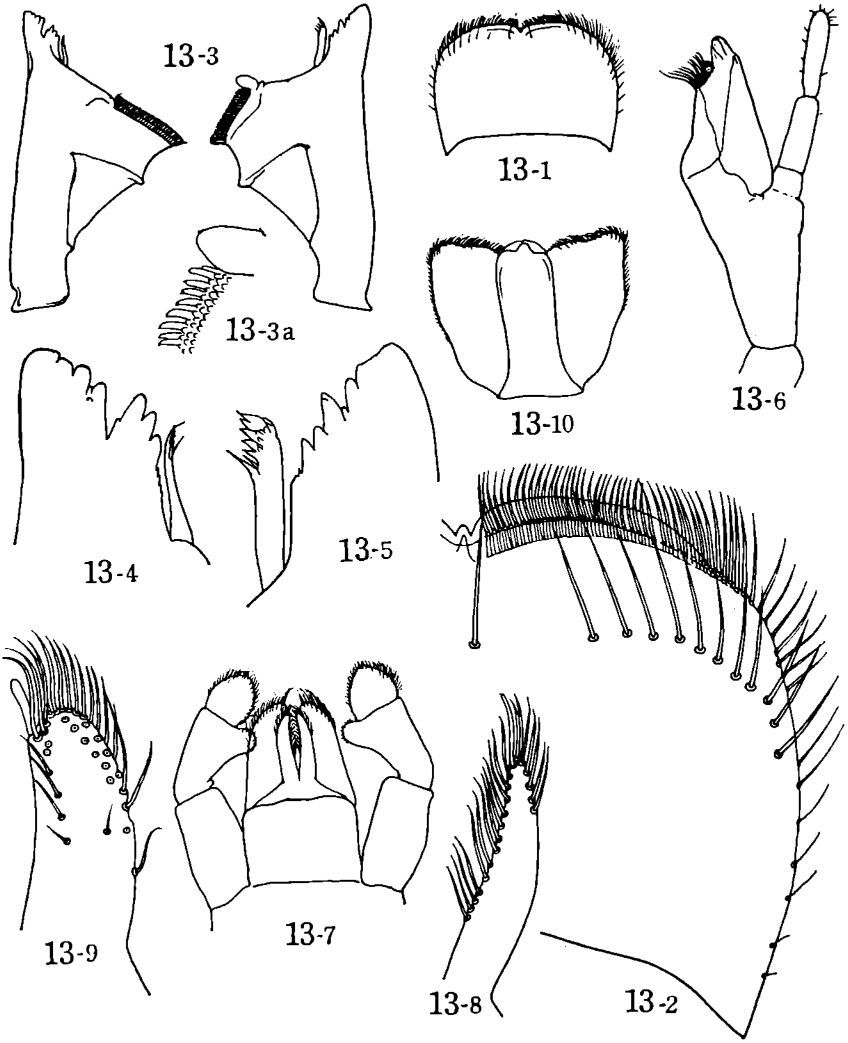

Fig. 13. Nymphal mouth parts of *Baetis noshaqensis* sp. n. 13-1, labrum; 13-2, right half of the labrum, enlarged, dorsal view; 13-3, left and right mandibles; 13-3a, part of molar of right mandible; 13-4 and 13-5, canine area of the left and right mandibles; 13-6, maxilla; 13-7, labium; 13-8, glossa of labium; 13-9, paraglossa of labium; 13-10, hypopharynx.

Paraglossae (Fig. 14–7) of labium extend a little beyond glossae; outer apical margin beset with long bristles arranged in two rows; a well-spaced row of six bristles inside the inner margin and with a large clavate seta on the inner apical corner (Fig. 14–9). Glossae slender, with a row of long bristles on the inner margin which reaches upper part of the outer margin beyond apex (Fig. 14–8). Labial palp three-jointed; second joint produced into a blunt process at its inner distal corner; terminal joint rounded conical, tip bluntly pointed, beset with numerous spines and fine bristles. Lateral lobes of hypopharynx wider than median lobe and dilated distally (Fig. 14–10).

Remarks: In the characters of the mouth parts, the present nymph resembles much the European *Baetis rhodani* (PICTET), which has been discussed in detail by MACAN (1950; cf. also UÉNO 1955). The labrum, maxillae and hypopharynx of the present nymph are of the *rhodani* type in general shape. Most features of the canine area of both mandibles are also of the *rhodani* type, but the arrangement of bristles on the glossae and paraglossae of labium of the present nymph differs from that of *rhodani*. The spines and setae on the margins of gill lamellae do not differ from those of *rhodani*, while the femora of the present nymph bear a row of long bristles which is not seen in *rhodani*. The present nymph has thus many characteristics of the *rhodani* series of the genus *Baetis* and may belong to the western Eurasian group, but its imago (♀) quite differs from any species belonging to the *rhodani* series.

7. **Cloeon zimini** TSCHERNOVA

TSCHERNOVA, 1930, p. 214.

Locality: Borak, 9 July, 1960, 1 ♀ subimago (in alcohol).

Length of body 6.5 mm., fore-wing 8.5 mm., caudal filaments 12.0 mm.

This subimago seems to be identical with *Cloeon zimini* TSCHERNOVA, particularly in the feature of abdominal markings, though no male is accessible to the writer.

Head, thorax and abdomen ochreous yellow. Abdominal tergites (Figs. 14–3, 14–4, 14–5) with brownish red markings, thus: a fine longitudinal stripe on the median line, on both sides of it present a pair of longitudinal stripes divergent posteriorly and reaches the hind margin of each tergite from II to VII; besides these, near the anterior end of each tergite there is a pair of comma-shaped markings, tips of which are prolonged behind forming convergent stripes; tergites IX and X entirely brownish red. Sternites with a pair of brownish red long stripes, somewhat divergent behind in sternites IV to V and then become parallel in VIII and IX.

Legs ochreous yellow, with a brown band at the middle of femora, proximal part of tibia and the distal part of tarsus brown; claws brown; hind tarsus with four free movable segments, the fifth fused to the tibia (Fig. 14–2). Two

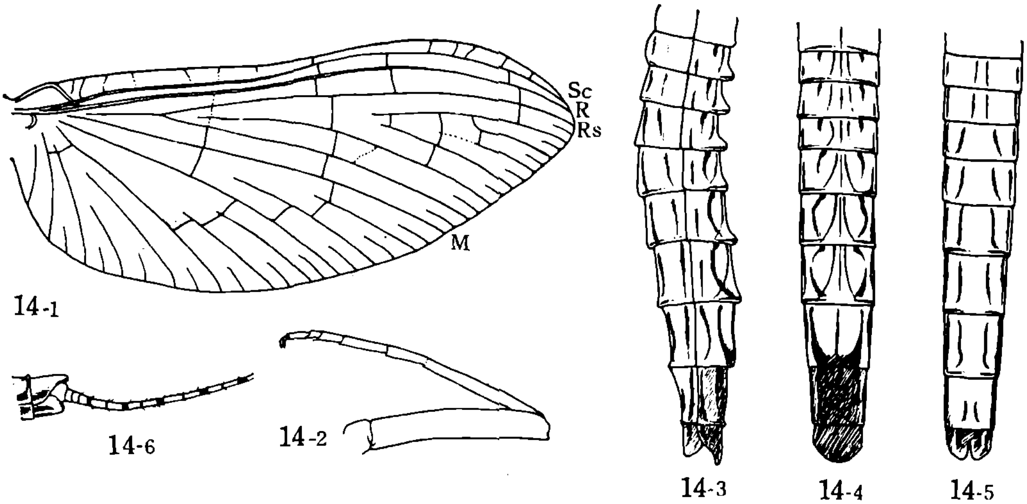

Fig. 14. *Cloeon zimini* TSCHERNOVA, ♀ subimago.
14–1, fore-wing; 14–2, hind-leg; 14–3, abdomen, lateral view; 14–4, abdomen, dorsal view; 14–5, abdomen, ventral view; 14–6, basal part of caudal filament.

caudal filaments, yellowish white, composed of about 35 joints, with blackish brown rings (Fig. 14–6),

Wings brownish smoked, especially in subcostal area; M of fore-wing not forked, intercalary veins on the outer margin single (Fig. 14–1). No hind-wings.

The type specimen was collected at Chiva, northeast of Buchara, Usbekistan, and in the suburbs of Tashkent, western border of the Alai–Pamir ranges.

8. **Ephemerella** sp.

Locality: Borak, 9 July, 1960, 11 nymphs (in alcohol).
Length of body 5.0–11.0 (full-grown), caudal filaments 4.0–5.5 mm.

Body rigid, somewhat arched dorsally and flattened ventrally; widest at mesothorax; reddish brown in colour, ventral side somewhat paler, wing-pads in full-grown nymphs black.

Head directed downward, frontal margin rounded, with a shallow emargination at middle, fringed, hind margin rounded; compound eyes large; three ocelli; with three pairs of blunt tubercles, one in the bases of antennae, small one behind the hind ocelli, and the other one near the hind margin between the compound eyes; besides these, more bigger one situated in front of the median ocellus.

Pronotum shorter than wide, a little widened posteriorly, nearly as wide as head, reddish brown, without distinct markings. Abdomen short and wide; lateral extensions present on the segments III to IX (Fig. 15–1), having postero-lateral processes, especially the great development in flattened posterior segments;

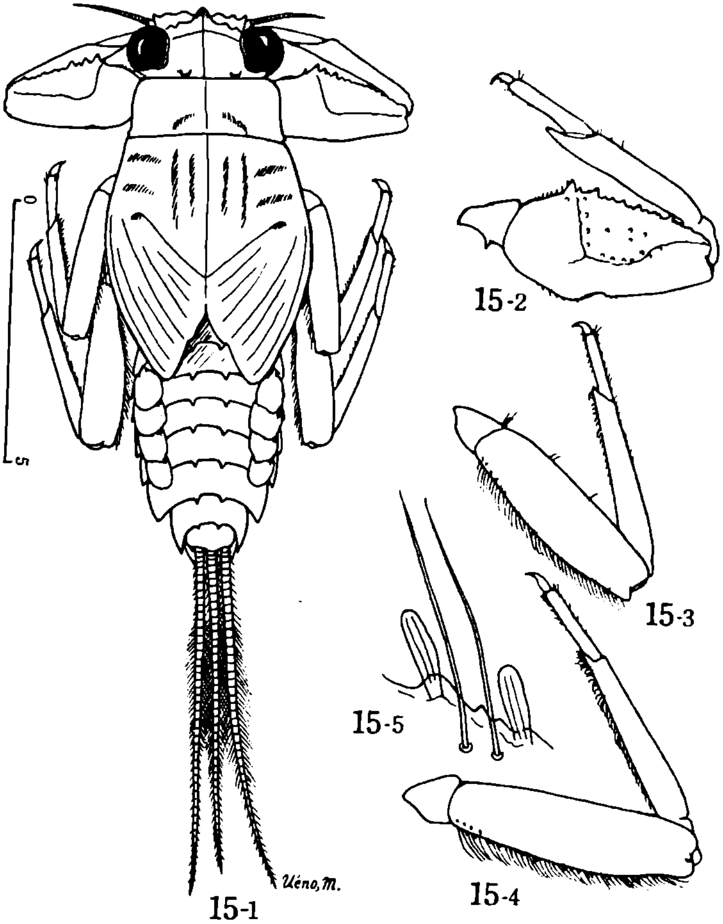

Fig. 15. Nymph of *Ephemerella* sp.
15–1, nymph of 10 mm. in body length, dorsal view; 15–2, fore-leg; 15–3, mid-leg; 15–4, hind-leg; 15–5, bristles and clavate spines on the outer margin of hind-leg.

there are a paired dorsal tubercles directed backwards on the tergites III–IX; 10th segment small and holded between the postero-lateral processes of the 9th segment. Three caudal filaments of nearly equal length, shorter than body, pale yellow, basal 1/4 with whorls of minute spines at joinings, but the remaining parts fringed with hairs on both sides (Fig. 15–1).

Legs rather large, the hind-leg the longest, and mid-leg the shortest; the length ratio, tarsus : tibia : femur is, in fore-leg, 1 : 2.3 : 2.3, mid-leg, 1 : 2.9 : 3.0, and hind-leg, 1 : 3.0 : 3.1. The fore-leg is especially robust, femur 1/2 as wide as long, widened at 1/3 from the proximal end, frontal margin armed with about 15 large and small tubercles, upper surface covered with small denticles; inner distal corner of tibia produced acutely; claw bears two small teeth on the inner margin. Mid- and hind-legs are of ordinary structure, femora fringed with a

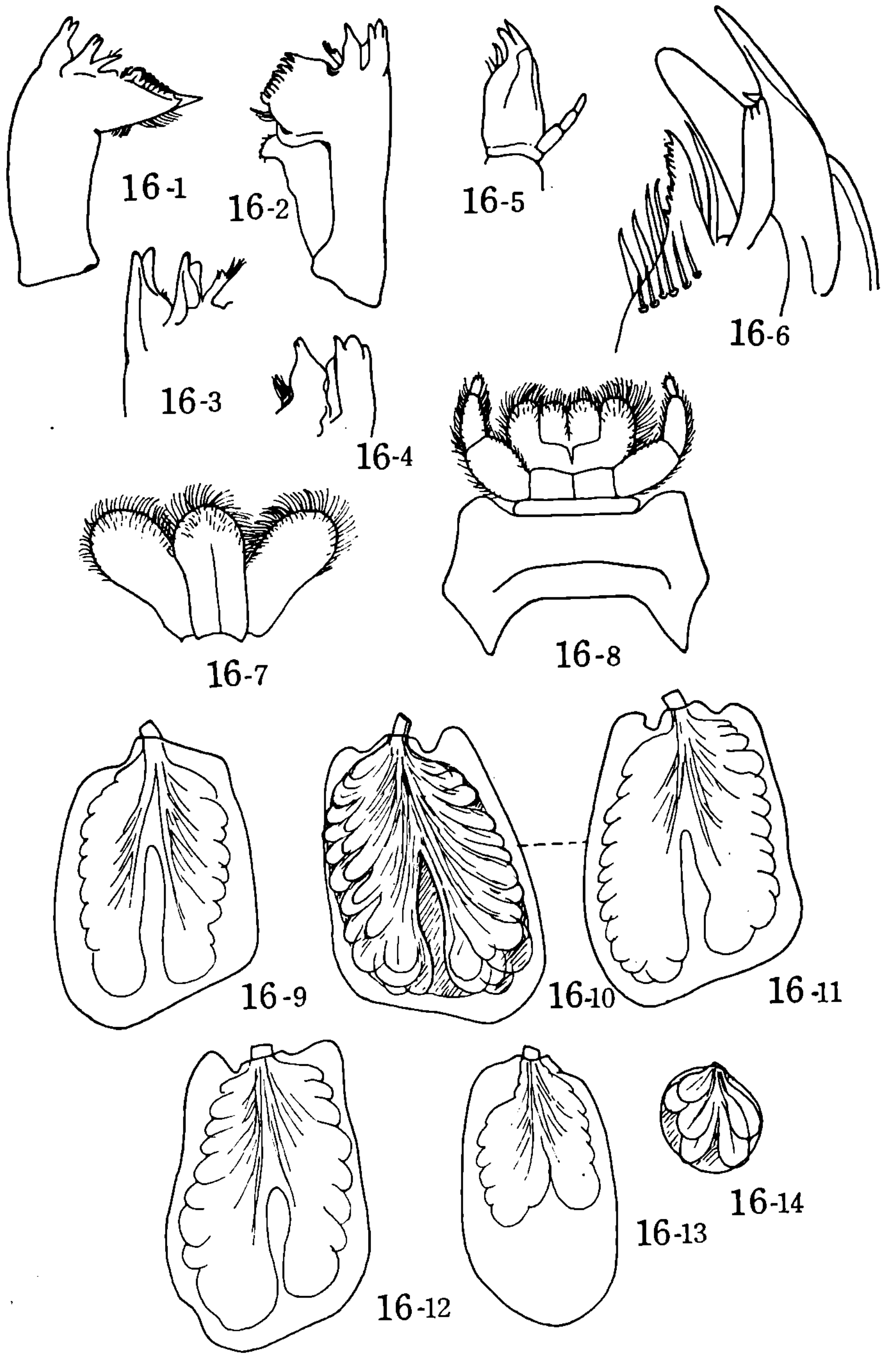

Fig. 16. Nymphal mouth parts and gills of *Ephemerella* sp.
16–1, left mandible; 16–2, right mandible; 16–3, left canines; 16–4, right canines; 16–5, maxilla; 16–6, apical part of galea-lacinia of maxilla; 16–7, hypopharynx; 16–8, labium; 16–9 first gill, anterior view; 16–10, second gill, posterior view, and 16–11, the same, anterior view; 16–12, third gill, anterior view; 16–13, fourth gill, anterior view; 16–14, fifth gill, posterior view.

row of long bristles and a row of clavate spines (Figs. 15-3, 15-4, 15-5).

Labrum more than twice as wide as long, frontal margin rounded, slightly emarginate in the median part, beset thickly with short bristles. Mandibles short and robust (Figs. 16-1, 16-2); canines short, nearly equal in length in both mandibles, prostheca well developed in both mandibles, each of them with a group of bristles on the inner apical margin (Figs. 16-3, 16-4). Maxillae conical at apex, with two terminal teeth and two more shorter serrated teeth on the inner apical margin, two rows of spines, one of which is composed of four spines on the inner margin and the other of six spines just inside the margin (Fig. 16-6); maxillary palp much shorter than the galea-lacinia, the third joint elongated conical. Glossae and paraglossae of labium (Fig. 16-8) nearly equal in length, the latter a little wider than the former, beset thickly with long bristles; labial palp relatively short and robust, terminal or the third joint rudimentary. Median lobe of hypopharynx rounded, lateral lobes also rounded apically and divergent each other.

Five pairs of gills present on the abdominal segments III to VII, wholly dorsal in position (Fig. 15-1), all lamellate and double, obtuse oval in shape, the seventh smallest and circular in shape; tracheation indistinct; all posterior lamellae are formed by two parts which cut into many small lobelets (Figs. 16-9~16-14).

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The Anurans collected by the Kyoto University Pamir-Hindukush Expedition 1960

By

Shun-Ichi UÉNO*

and

Kenji NAKAMURA**

A small collection of anurans made in Afghanistan by the Kyoto University Expedition 1960 was submitted to the authors for identification. It includes ten specimens, of which a majority is very young. According to Professor Riozo YOSII, to whom the authors' hearty thanks are due, all these specimens were taken along the margins of brooks or of paddy fields. It was not easy to determine the material because of the immaturity, and the authors are not fully convinced of the accuracy of their conclusion. In their best judgement, however, the collection is composed of only two species, a toad and a frog. They are as given in the following lines.

Bufo viridis LAURENTI, 1768

Specimens examined: 1 ♀, Ishkashim, Wakhan, N. Afghanistan, 30-VIII-1960, collected by R. YOSII; 1 young, the same locality, 1-IX-1960, by R. YOSII; 7 young, Kabul, Afghanistan, 22-VI-1960, by R. YOSII.

Notes. The female specimen from Ishkashim has double subarticular tubercles on the penultimate segment of the fourth toe, but is otherwise quite similar to the others. Of the seven specimens from Kabul, six are too young (only 20 mm or so in body length) to afford satisfactory examination. All of these are regarded as belonging to *B. viridis* with some reservation.

Rana (Rana) ridibunda ridibunda PALLAS, 1771

Specimen examined: 1 ♀, Khanabad, N. Afghanistan, 4-VII-1960, collected by R. YOSII.

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Trichoptera of Afghanistan

By

Glenn B. WIGGINS*

Samples of Trichoptera imagos collected in Afghanistan by Dr. YOSII of Kyoto University were sent to me by Dr. TSUDA of Nara Women's University. The samples contained the species as followings:

1. **Rhyacophila** sp.

   ♀, 26. VII. 1960, Mt. Noshaq, altitude 3800 m.
   ♀, 25. VII. 1960, Mt. Noshaq, altitude 3800 m.
   ♀, 27. VIII. 1960, Mt. Noshaq, altitude 3800 m.
   ♀, 24. VIII. 1960, Qasideh.

2. **Himalopsyche** sp. (nr. **lachlani BANKS**)

   ♀, 25. VII. 1960, Mt. Noshaq, altitude 3800 m, at a spring.

3. **Glossosoma** sp.

   ♂♀, 25. VIII. 1960, Ishkashim.

4. **Psychomyia** sp.

   ♂, 5. VII. 1960, Faizabad.

5. **Cheumatopsyche** sp.

   ♂♀, 5. VII. 1960, Faizabad.

6. **Apatania brevis (MOSELY)**

   ♂♀, 9. IX. 1960, Shewa Lake.
   9. IX. 1960, Shewa Lake Darwaz.

7. **Dinarthrum** sp. (**iranicum** complex **SCHMID** 1959)

   ♂♀, 24. VIII. 1960, Qasideh.
   ♂, 25. VIII. 1960, Ishkashim.

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* The Royal Ontario Museum University of Toronto.

Pterophoridae and Aegeriidae (Lepidoptera) from Afghanistan*

By

Kôji YANO**

The following list of Lepidoptera from Afghanistan is based on the specimens collected by the Kyoto University Scientific Expedition to the Karakoram and Hindukush. The specimens dealt with here consist of three species belonging to the families Pterophoridae and Aegeriidae.

I with to express my sincere gratitude to Prof. K. Yasumatsu of Kyushu University for his kind guidance, and to the authorities of the Expedition who gave me the opportunity of investigation of these valuable specimens.

Family **Pterophoridae**

1. **Crombrugghia laetus** (Zeller, 1847)

Pterophorus laetus Zeller, 1847, Isis 12: 903.

Specimen examined: 1 ♀, Faizabad, Afghanistan, 8. vii. 1960, R. Yosii leg.

Distribution: S. Europe, N. America, Canary Is., Afghanistan, Asia Minor.

2. **Pterophorus monodactylus** (Linné, 1758)

Alucita monodactyla Linné, 1758, Syst. Nat. ed. 10: 542.

Specimen examined: 1 ♂, Faizabad, Afghanistan, 8. vii. 1960, R. Yosii leg

Distribution: Japan, Europe, N. Africa, C. Asia, Afghanistan, N. America.

Family **Aegeriidae**

3. **Dipsosphecia viguraea** Püngeler, 1912

Dipsosphecia viguraea Püngeler, 1912, in Seitz, Macrolep. (Pal.) 2: 394, pl. 50 h.

Specimen examined: 1 ♀, Mt. Noshaq, 4000 m., Afghanistan, 3. viii. 1960, R. Yosii leg.

Distribution: C. Asia, Afghanistan.

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* Contribution Ser. 2, No. 128, Entomological Laboratory, Kyushu University.

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On some Collembola of Afghanistan, India and Ceylon, collected by the KUPHE-Expedition, 1960

By

Riozo YOSII *

When I have studied the Collembolan material of Hindukush, which was published in 1963, I have not dreamed that I may have chance to collect further materials by myself from the high altitudes of Afghanistan. KUPHE-expedition 1960 has brought this idea in reality and some additional specimens have been brought under my investigation. To the Academic Alpine Club of Kyoto (AACK) and, above all, to Prof. Y. SAKATO, the leader of our party, I must express my hearty thanks.

Collection of Collembola is a matter of considerable difficulty in such an arid region as Afghanistan, compared to my experience in Japan and other wet countries and, as I have had other duties of collecting both plants and animals of all sorts, my Collembolan material is as yet too scanty to cover all the main species of Afghanistan. However, together with the nice report of the same subject given by STACH, 1960, 1963, we have relatively a good knowledge of the region. Pamir-Hindukush Area is exclusively palaearctic when viewed from the constitution of the Collembolan fauna and strong influence of the Mediterranean element is prevailing. Two conspicuous genera *Drepanosira* and *Orchesellides* are well represented in the Afghanic fauna and their presence would characterise the Collembolan fauna of the Inner Asia. Recently the Collembolan fauna of Tuva, the district north to the Tien-Shan Mountains was studied by S. K. STEVAJEVA, 1963. According to her result these two genera are absent and the region has more Collembolan species common with Europe than Afghanistan.

On my way from Kabul to Tokyo I have visited many places of tropical Asia to make tentative collection in each places. Those from Bombay, Calcutta and Colombo are enumerated in the second part of this report. In this respect I must express my cordial thanks to Mr. T. IKAWA of the MARUBENI-IIDA Co. and his family in Bombay for their helps and hospitalities. Many valuable materials might have not been obtained without their assistance.

I. Afghanistan

1. **Ceratophysella gibbosa** (**BAGNALL,** 1940)

syn. nov. *Ceratophysella azteca* : YOSII, 1962

1 expl. Kabul, 10. VI 1960, 2 expl. Ishkashim, Wakhan, 16. VIII 1960.

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* Yoshida College, Kyoto University.

Through elaborate works of Dr. LAWRENCE, who has checked the type specimen, the problem with *C. gibbosa* is already cleared. *C. azteca* of USA is a synonym of it. The Afghan example coincide quite well with the English examples which I have received from Dr. LAWRENCE. The median swelling of abd.V is very conspicuous. *C. stercoraria* STACH, 1963 would be almost identical with this species.

Distribution: England, Germany, North Africa, USA, Mexico, Afghanistan (nov.).

2. **Hypogastrura** (s. str.) sp.

1 ♀, Ishkashim, Wakhan, 18. VIII 1960

Large species with brown body colour. Anal spines very short. The example is so badly damaged and furca is crashed that it is impossible to identify it exactly.

3. **Xenylla badakhshanica** sp. n. Fig. 1.

6 expl. Borak, Badakhshan, 9. VII 1960

Body length up to 0.8 mm. Colouration uniformly blue black by irregularly dispersed black pigments. Antennae intensely pigmented. Ventral side and legs paler. Ant./head as 17 : 20. Ant. ratio as 15 : 15 : 18 : 20, the first two segments are constricted and each with a transverse row of setae. Ant. III and IV confluent dorsally. An apical bulb is conspicuous, subapical sensory setae are large, blunt, thick and located outer 3, inner 1. Third antennal organ is composed of a pair of rounded rods concealed under the integumentary fold of round shape, both sides of which are guarded by a blunt, long sensory setae. Eyes 5+5, upon common patch. Postantennal organ absent. Labrum with setae 4/5, 5, 4, the distal row of them very strong, exceeding the margin. Large 4 tubercles are located along the fore-margin of it. Legs short, unguis dorsally carinate and with a small inner tooth near the apex. Unguiculus absent. Tenent hair very long and slender, apically ending in a spherule and 1, 1, 2 in number upon each legs. Ventral tube with 3+3 or 4+4 setae. Rami tenaculi 2-toothed, corpus without seta. Furcala is very much reduced. Manubrium is not well separated from the sternum and with a row of 3+3 setae. Dentes is rounded both in lateral and ventral view and provided with one strong seta. Mucro is quite absent. Abd.VI bears a pair of small spines, curving, 2/5 the length of inner side of hind unguis and upon low papillae, which are remote to each. Integument is finely granular. Body setae are short and arranged in usual way of the genus upon head. Th. I with 3+3 setae. Th. II, III with three (a,m,p) rows of setae add p_4 is s. s. Abd. I-III are bearing two (a,p) rows of setae and p_6 is s. s. Abd. IV has three rows of setae and p_4 is s. s. Abd. V has, again, two rows of setae and p_3 is s. s. The usual body setae of dorsal side of the trunk are some-

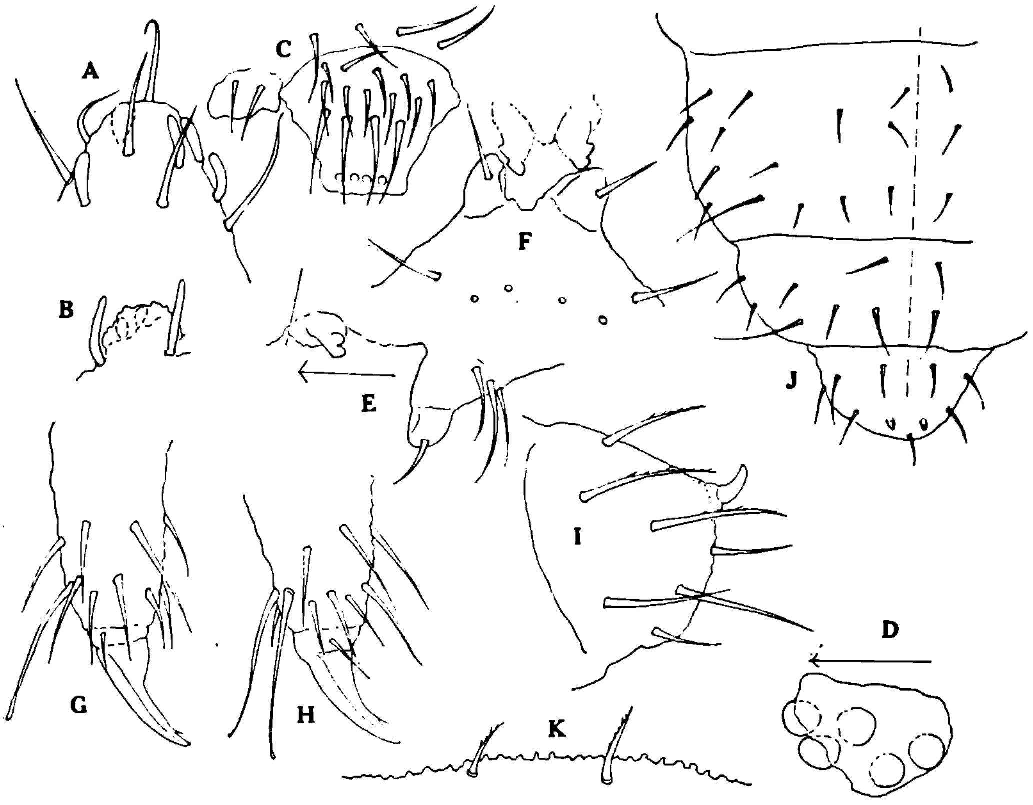

Fig. 1 *Xenylla badakhshanica* sp. n.
A : End of Ant. IV, B : Ant. III-organ, C : Labrum, D : Eyes, E, F : Furcula (lateral and ventral view), G : Fore-leg, H : Hind-leg, I : Abd. VI (lateral view), J : Chaetotaxy of abd. IV-VI, K : Lateral view of abd. III.

what unilaterally serrated upon posterior body segments. s. s. are becoming longer, larger posteriorly and it is more than 2 times the usual setae in length. This arrangement of body setae is, in principle, just the same with *X. humicola* (cf. Yosii 1961, p. 5).

The species is with its reduced form of furcula, nearly related with *X. börneri* Axelson, 1905 of Europe. However, tenent hairs are 2, 2, 2 in the cited species and 1, 1, 2 in this new species. Also body setae are not simple, but lightly serrated.

4. **Onychiurus sakatoi** sp. n. Fig. 2.

2 ♀, 1 ♂, Karezmyl near Kabul, 16. VI 1960
3 ♀, Borak, Badakhshan, 9. VII 1960

Body length 1.5 mm. White. Ant./head as 7 : 6. Ant. ratio as 10 : 18 : 18 : 28. Ant. IV distally with a small subapical pit and a spherule. Ant. III-organ

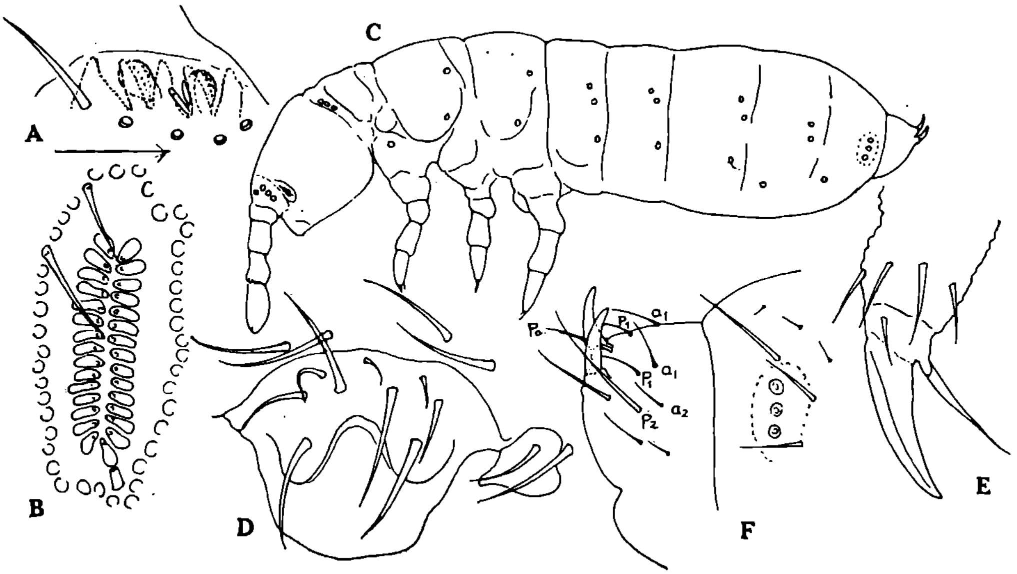

Fig. 2 *Onychiurus sakatoi* sp. n.
A : Ant. III-organ, B : Postantennal organ, C : Lateral view, showing the arrangement of pseudocelli, D : Labrum, E : Fore-claw, F : End of abdomen.

is composed of 5 low papillae, 5 guard setae, 2 minutely granulated bulbs and two short rods. Labral setae 4/3, 4, 2. Median pair of prelabral setae widely apart. Inner pair of the second row and a pair of third row of setae are much stronger than others. Outer ramus of maxilla reduced, with only 1 seta on it. Unguis carinate, without teeth. Unguiculus narrow, without basal lamella and extending distally in filiform elongation, but not attaining the apex of unguis. Ventral tube with more than 7 pairs of setae. Ventral organ is not observed in one male with well developed genital plate. Furcal rest is a median semicircular area smooth or granulated and with 1+1 small setae. Anal spine is moderately long, slightly curving and upon low papillae. Pseudocelli are arranged dorsally as 4, 3/0, 2, 2/3, 3, 3, 3, 1+3. In one example from Borak one side of abd. V has 1+4 ocelli. Ventrally no pseudocellus except for 1+1 on head. Antennal basis well defined. 3 pseudocelli of hind margin of head are lying outside of the granulated area and some 3+3 setae are lying between them. Abd. V is lightly hanging over abd. VI, with 3+3 pseudocelli posteriorly and the area around them is slightly swollen and with larger granules. Abd. VI is bearing no a_0, but with large p_0. The segment has larger granules upon posterior half.

The species which is dedicated to Prof. Y. SAKATO, the leader of our Noshaq party, is near *O. octopunctatus* (TULLBERG, 1876, sensu STACH, 1954) in many respects. However, male ventral organ is absent and each unguis has no inner tooth.

5. **Onychiurus ombrophilus** Stach, 1960

3 ♀, Karezmyl near Kabul, 16. VI 1960

They coincide fairly well with the detailed description of Stach. However, the posterior margin of head has 3+3, 3+2 and 2+2 pseudocelli. In other respects no difference is to be found.

Distribution : Endemic to Afghanistan

6. **Onychiurus** cf. **afghanistanensis** Stach, 1960

1 ♀, Karezmyl near Kabul, 16. VI 1960

The material is restricted and the identity is not sure. It is, however, very near *O. afghanistanensis*, differing only in the arrangement of pseudocelli. It is namely 2, 1/0, 1, 1/3, 3, 3, 3, 1+3. The integument is very roughly granulated all over.

7. **Isotomina pontica** Stach, 1947 Fig. 3

5 expl. Karezmyl near Kabul, 18. VI 1960, 2 expl. Faizabad, Badakhshan, 6. VII 1960.

Body length 1.2 mm. Colour dark gray caused by strongly mottled black pigments all over the body. Antennae also pigmented. Legs and furcula pale.

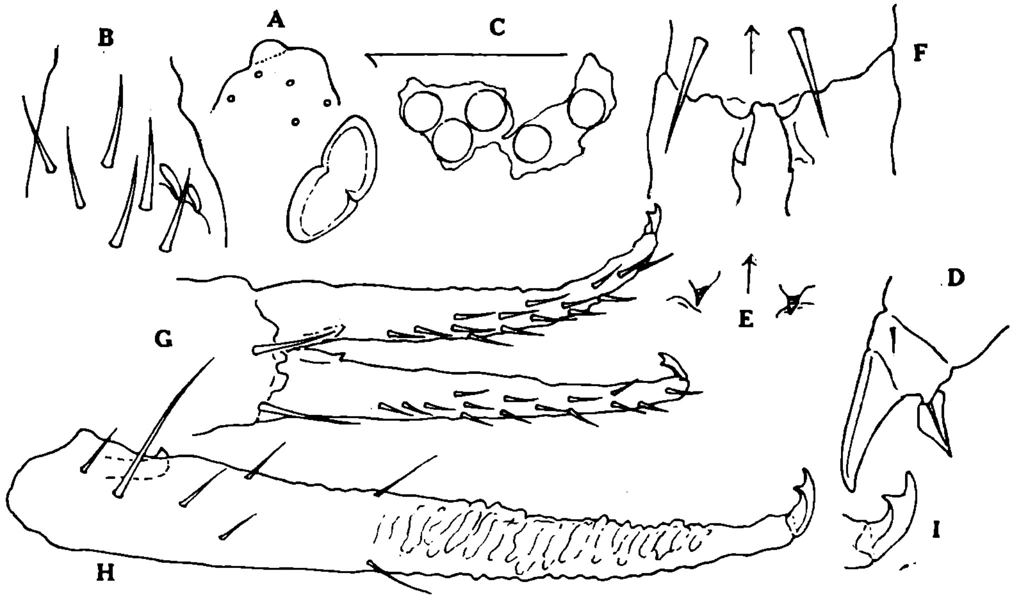

Fig. 3 *Isotomina pontica* STACH
A : End of ant.IV, B : Ant.III-organ, C : Eyes and postantennal organ, D : Hind-claw, E : Hooks connecting manubrium to abdominal sternum, F : Ventral setae of manubrium, G : Furca in ventro-lateral view, H : Dorsal view of dentes, I : Mucro.

Ant./head as 1.0. Ant. ratio as 10 : 17 : 15 : 26. Ant.IV apically with a low, hemispherical process (fig. A). Ant. III-organ is a pair of rods in a shallow groove. Ant.I has dorsally two transverse rows of setae. Labrum with setae arranged as 4/5, 5, 4, distal ones thick. Labral margin without structures. Eyes 5+5, well pigmented, but not forming an ocular field. Postantennal organ is broadly elliptical, with a distinct ledge at about the middle on posterior side. Subcoxa well developed and somewhat protruded from the tergal plate. Unguis broad, without tooth. Unguiculus triangular and also not toothed. Ventral tube anteriorly without setae, posteriorly with 1+1 setae. Each lateral flap has 3 setae. Rami tenaculi quadridentate, corpus with one anterior seta. Furcula well developed, surpassing far the end of abdomen. ma : d : mu as 20 : 35 : 3. Manubrium converging, dorsally with many feeble setae. Ventral side has proximally a pair of simple hooks to connect it with the ventral side of the body. Distal manubrial setae 1+1, very strong. Terminal thickening is rounded, protruded conspicuously as in *I. thermophila*. Dentes converging, minutely crenulated dorsally. Proximal setae 5, including a longer one. A pair of slender seta is present at about the middle. Ventral setae strong and arranged aproximately as 1, 1, 1, 3, 2, 2, 2, 2=14. Mucro elongate, equally bidentate distally. Body elongate, abd.V is distinctly divided by a transverse suture from abd.IV, but abd.VI is quite confluent with abd.V. All body setae are short, smooth and slightly yellowish under microscope.

The Afghanic material corresponds fairly well with the short but precise description of STACH, who has found it from Hungary and Caucasus.

Distribution : Hungary, Caucasus, Lebanon (CASSAGNAU, 1955), Afghanistan (nov.)

8. **Desoria notabilis** (SCHÄFFER, 1896)

4 expl. Karezmyl near Kabul, 18. VI 1960

The Afghanic material is identical with the description of STACH, 1947 in all respects. However, eyes are 2+2 or 3+3 in number and body is relatively pale in colour, thus corresponding to ab. *menotabilis* (BÖRNER, 1903).

Distribution : Europe, Ukraina, Caucasus, Afghanistan (nov.), India.

9. **Isotoma decorata BROWN,** 1926 (sensu YOSII, 1963)

2 expl. Kabul, 8. VI 1960

Two examples are well pigmented. Mucro has 4 teeth, with an additional small outer tooth.

Distribution : Iraq, Afghanistan, USSR (Turkestan)

10. **Isotomurus afghanicus** sp. n. Fig. 4

18 expl. Karezmyl near Kabul, 16. VI 1960

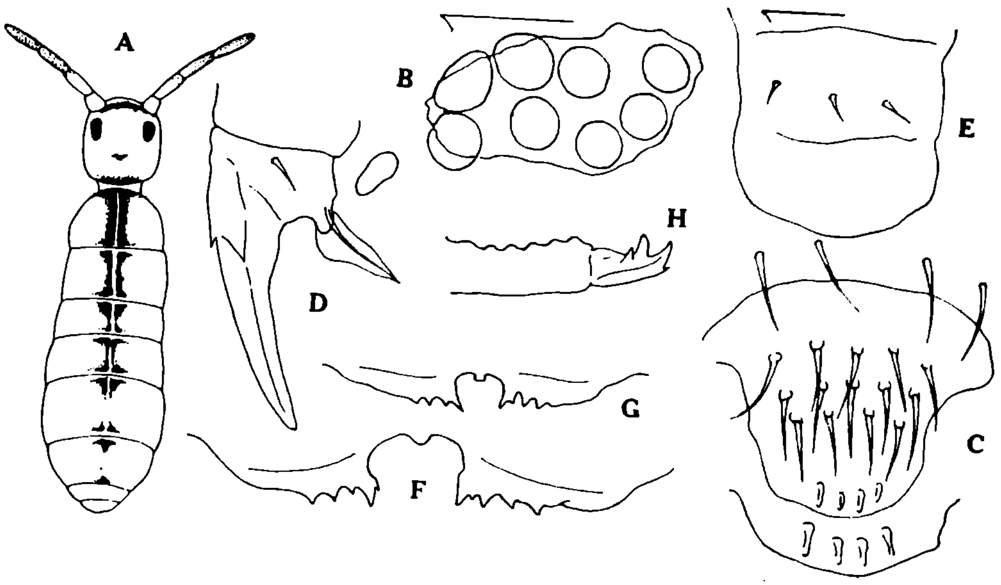

Fig. 4 *Isotomurus afghanicus* sp. n.
A : Dorsal view, B : Eyes and postantennal organ, C : Labrum, D : Hind-claw, E : Lateral flap of ventral tube, F, G : Terminal thickening of manubrium, H : Mucro.

Body length up to 1.0 mm. Ground colour whitish. Antennae slightly bluish distally, other extremities pale. Body with a dorsal longitudinal streak from th. II to abd.IV. Often some mottlings of brown pigments are to be seen laterally upon each segments (f. *maculosa* f. n.). Eyes and a median frontal spot is black. Ant./head as 16 : 13. Ant. ratio as 28 : 35 : 40 : 53. Ant. IV with a small conical subapical process. Ant. III-organ is two rods separately situated. Eyes 8+8, equally large and intensely pigmented. Postantennal organ is elliptical, smaller than an eye in diameter and faintly notched at about the middle or quite entire. Labral setae 4/5, 5, 4. Inner pair of prelabral setae wide apart. Labral margin with 4 high, longitudinal ridges. Outer ramus of maxilla has a papillated seta and 3 usual setae. Unguis carinated, with a pair of lateral and one faint dorsal tooth, ledge is not to be seen. Inner tooth is absent both on unguis and unguiculus. Larger setae of tibiotarsus are rugose, not feathered. Ventral tube hirsute both anteriorly and posteriorly, lateral flap has 3 setae each. Rami tenaculi quadridentate, corpus with ca. 10 short anterior setae. Furca long, man : d as 4 : 5. Terminal thickening of manubrium is conspicuously multidentate. Dorsal side of dentes with many short setae as in other *Isotomurus*. Dorsal annulation is ending just before the mucro. Mucro is quadridentate, apical (ventral) tooth small. The third tooth is not lamellated and mucronal seta is quite absent in all examples examined. Body setae are smooth, larger ones are slightly rugose.

The species is near *I. palustris* (MÜLLER, 1776) f. *principalis* in body pattern, but different in the form of manubrial thickening and in the absence of lamella and seta of mucro. Morphologically *I. afghanicus* is near *I. infuscatus* YOSII, 1963 of Japan, differing in the body pattern and rugose larger setae of the trunk.

11. **Entomobrya lindbergi** STACH, 1960

5 expl. Faizabad, Badakhshan 6. VII 1960, 7 expl. Kabul 8. VI 1960, 10 expl. Kabul 10. VI 1960.

All examples have pale body colour. A longitudinal stripe laterally upon abd.IV is poorly present. In morphological details, however, they must be identified as *E. lindbergi*.

Distribution : Afghanistan, Egypt.

12. **Entomobrya pamirensis** sp. n. Fig. 5

18 expl. Mt. Noshaq (4,200 m. alt.), Wakhan 25. VII 1960, 5 expl. ibid, 20. VII 1960, 52 expl. Ishkashim, Wakhan 16. VII 1960

Length of body 1.8 mm. Colour uniformly white. Antennae violet. A broad transverse band across the eyes. Th. II, III diffusely violet laterally. Posterior margin of abd. II, III often very narrowly banded. Distal part of abd.IV and abd.V, VI diffusely pigmented or quite pale. Other extremities pale. Ant./head 3 : 1. Antennae about 2/3 of the body. Ant. ratio as 8 : 13 : 14 : 18. Ant. IV distally with two spherical end bulbs. Ant.III-organ is two blunt rods, each separated and the region is beset with many smooth, spiny setae, some of which are curving and alike to sensory setae, but not so thick. Labrum with setae as 4/5, 5, 4, prelabral setae densely serrated. Median intruding of distal area is rounded and broad. Distal labral margin has 4 prominent tubercles, each having 3-4 secondary tubercles or spinules upon it. Eyes 8+8. intensely black. Unguis very slender, a pair of lateral teeth insignificant, inner teeth 3, 3, 3, well developed. Unguiculus lanceolate, typical of the genus and outer margin is often slightly ciliated. Tenent hair very long, rather thick on its basal half and distally truncate, not much swollen. Ventral tube short, anterior face with many ciliated setae, the terminal 3+3 are longer and broader than others. Posterior face has some 14 feeble setae, the distal pair is stronger and smooth, while other are minutely ciliated. Lateral flap with some 9 smooth setae. Furca in ratio as 27 : 32. Manubrium and dentes dorsally with many ciliated setae, ventrally with many very slender, ciliated and slightly flattened ones. Manubrial terminal thickening is slightly protruding on inner side. Dentes is dorsally crenulated, leaving distally smooth portion about 2 times the mucro in length. The latter is equally bidentate and with a basal spine. Male genital ring has many (ca. 15) papillae, inner setae are in 7 pairs, the dorsal 3+3 are slender, narrow and straight, then follows 2+2 broad, cuneated setae. Subventrally 1+1 slender setae and ventrally a pair of strong, thick, elongated setae are present. The latter is apically rounded, but not spatulated. Larger body setae are truncate apically as usual, smaller ones are converted to flat, scale-like, lanceolate setae with longitudinal striations in most cases.

E. pamirensis is near *E. assuta* FOLSOM as recognized by CHRISTIANSEN, 1958 and SELGA, 1962. The last author has figured the male genital ring very exactly by the material of Annobon Island, to which *E. pamirensis* coincides very exactly. However, the structure of labral margin is quite different and more alike to that of *E. lindbergi*. This last species has an another form of

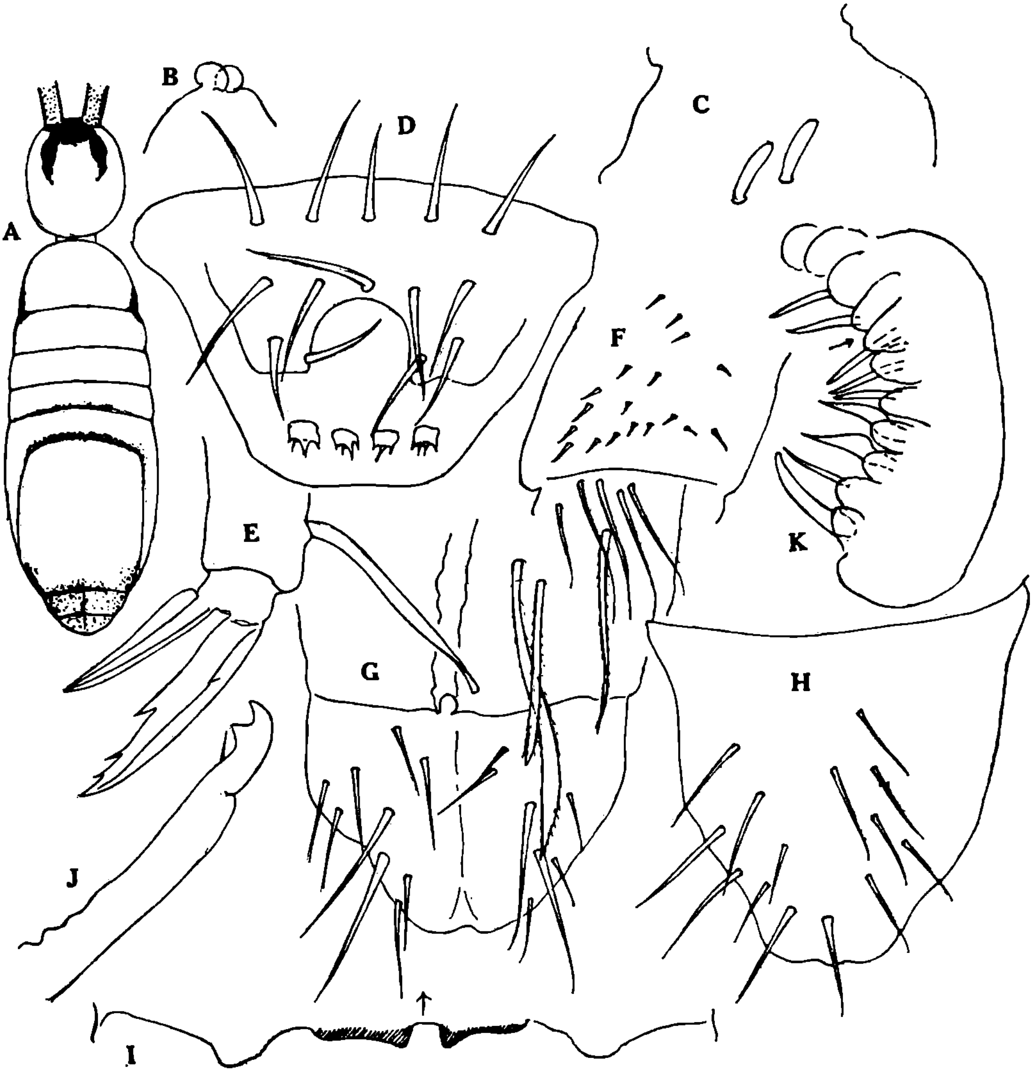

Fig. 5 *Entomobrya pamirensis* sp. n.
A : Habitus, B : End of antennae, C : Ant. III-organ, D : Labrum, E : Fore-claw, F : Trochanteral organ, G : Ventral tube (anterior face), H : Do (posterior face), I : Terminal thickening of manubrium, J : Mucro, K : Male genital orifice.

male genital ring. With its peculiar flattened body setae, the species is probably a relative of *E. kincaidi* FOLSOM, 1902 (sensu CHRISTIANSEN, 1958) of Alaska and *Himalanura indica* BAIJAL, 1958. All of the Ishkashim examples are without any pigment upon trunk, although a transverse streak of the head is very conspicuous. Labral structure and male genital area is just the same with the Noshaq form.

Distribution : Endemic to Afghanistan.

13. **Pseudosinella inaequalis** STACH, 1960

15 expl. Borak, Badakhshan 6. VII 1960, 24 expl. Faizabad, Badakhshan 6. VII 1960.

Labral structure is as figured in YOSII, 1963, but the basal tubercle is often missing and only a pair of small spinules are to be found in this case. The identity with *L. octoculatus* CAROLI, 1914 (Tripoli) and *P. octopunctata* BÖRNER, 1901 must be studied.

Distribution : Afghanistan and West Pakistan.

14. **Pseudosinella genghizkhani** sp. n. Fig. 6

2 expl. Faizabad, Badakhshan, 6. VII 1960

Body length up to 0.8 mm. Colour totally white. Antennae short and blunt. Ant./head as 57 : 45. Ant. ratio as 10 : 15 : 12 : 20. Ant.III short, almost club-shaped and there may be seen 4 smooth setae instead of ant.III-organ (aberrant ?).

Ant. IV not annulated, without end-bulb and with many ciliated and smooth,

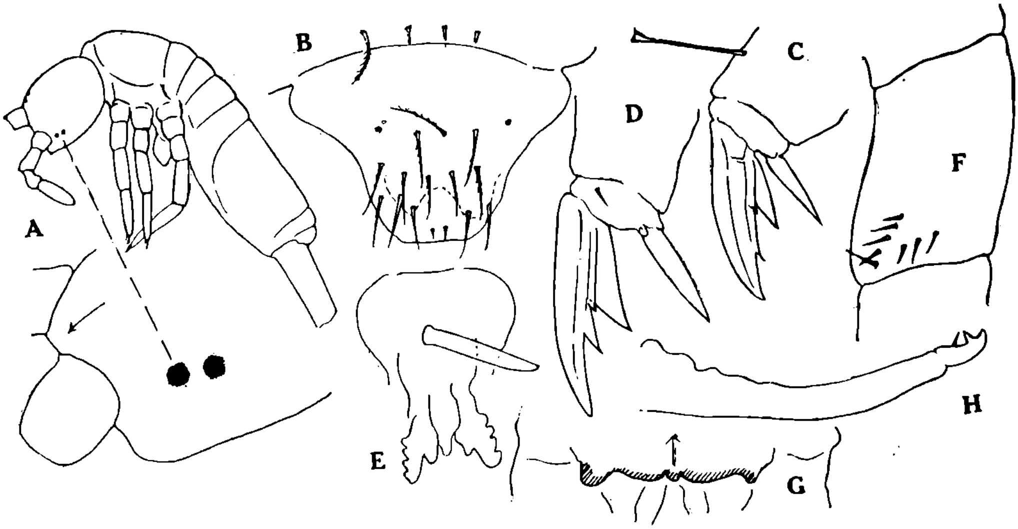

Fig. 6 *Pseudosinella genghizkhani* sp. n.
A : Habitus, B : Labrum, C : Fore-claw, D : Hind-claw, E : Tenaculum, F : Trochanteral organ, G : Terminal thickening of manubrium, H : Mucro.

curving, sensory setae. Eyes 2+2, isolated to each other, subequal in diameter, intensely black. Labral setae 4/5, 5, 4, not only the prelabral setae, but also the first and the second row of labral setae are ciliated. Distal margin bearing 1+1 minute spines and median intrusion of smooth distal area is broad. Unguis carinate, from a pair of inner basal teeth the outer one is largely wing-like, the another is very minute. An inner distal tooth is large. Unguiculus is acutely lanceolate, untoothed. Tenent hair feeble, as long as 1/2 of the inner side of unguis and distally faintly enlarged. Trochanteral organ composed of ca. 8 small, smooth setae arranged in L-shape. Ventral tube anteriorly with some 5+5 ciliated, long setae. Posterior face unknown. Lateral flap with 2 ciliated and 2 smooth setae in one example. Rami tenaculi quadridentate, corpus with one thick seta Furca elongate, man : d as 1 : 1. Manubrium is ventrally scaled, dorsally with some feeble, ciliated setae. Terminal ventral thickening usual. Dentes tapering, ventrally scaled, dorsally crenulated, leaving terminal smooth portion ca. 3.5 times the mucro. Mucro equally bidentate, with a basal spine. Mesothorax moderately hanging over the head. All segments with hyaline, small scales. Abd. III : IV as 1 : 4.

The species is near *P. imparipunctata* GISIN, 1953 of Switzerland, but 2+2 eyes are of equal size in the present new species.

15. **Drepanosira ornata** (BONET, 1930)

1 expl. Mt. Noshaq. Wakhan, 20 VII 1960

Distribution : Afghanistan, Pakistan, India (Himalaya).

16. **Orchesellides poli** sp. n. Fig. 7

16 expl. Mt. Noshaq (3,800 m. alt.), Wakhan 25. VII 1960.

Body length up to 2.3 mm. Ground colour pale, but each segment of the trunk is darkly gray to violet gray by integumentary pigments. Each segmental margins are left unpigmented. Antennae dark distally and end of each segments are dotted with dark gray to violet. Coxae dark, other extremities are pale. Ant./head as 12 : 5. Ant. ratio as 10 : 40 : 65 : 120. Ant.I subsegmented. Ant. IV not annulated, but with a faint undulating margin. Ant. IV distally with two rounded apical bulbs and a subapical, conical process, with many short ciliated setae and feeble, curving sensory setae. Ant.III-organ is two small rods without groove and another rod of the same shape is located slightly lateral to them. Eyes 8+8, G, H smaller than others, intensely pigmented. No special structure between antennae. Labrum normal, labral setae 4/5, 5, 4, prelabral setae smooth and long, median intrusion of distal area rounded and broad. Distal margin is bearing 4 very strong, hook-like projection. Mandibles, maxillae and labium not modified. Some 5-6 setae directly behind the labial papillae are smooth, while other ventral setae are intensely feathered. Legs well developed, unguis slender, dorsally carinate, with a pair of lateral teeth distal from the middle. Inner margin with a pair of basal and one distal teeth, all of them located far distal from the middle. Unguiculus slender, with four margins, with one outer tooth at about the middle. Tenent hair as long as the inner side of unguis, slender and not swollen to the end. Opposite seta present upon hind-legs. Trochanteral organ is restricted to one corner of the segment, composed of ca. 12 long, smooth setae in comb-like assembly. Ventral tube anteriorly with many slender, ciliated setae, the distal pair is very strong. Posterior face with more number of smaller setae. Lateral flap is densely beset with 4 smooth and some 25 feathered setae. Rami tenaculi quadridentate, corpus with one anterior seta. Furca long, man : d as 2 :

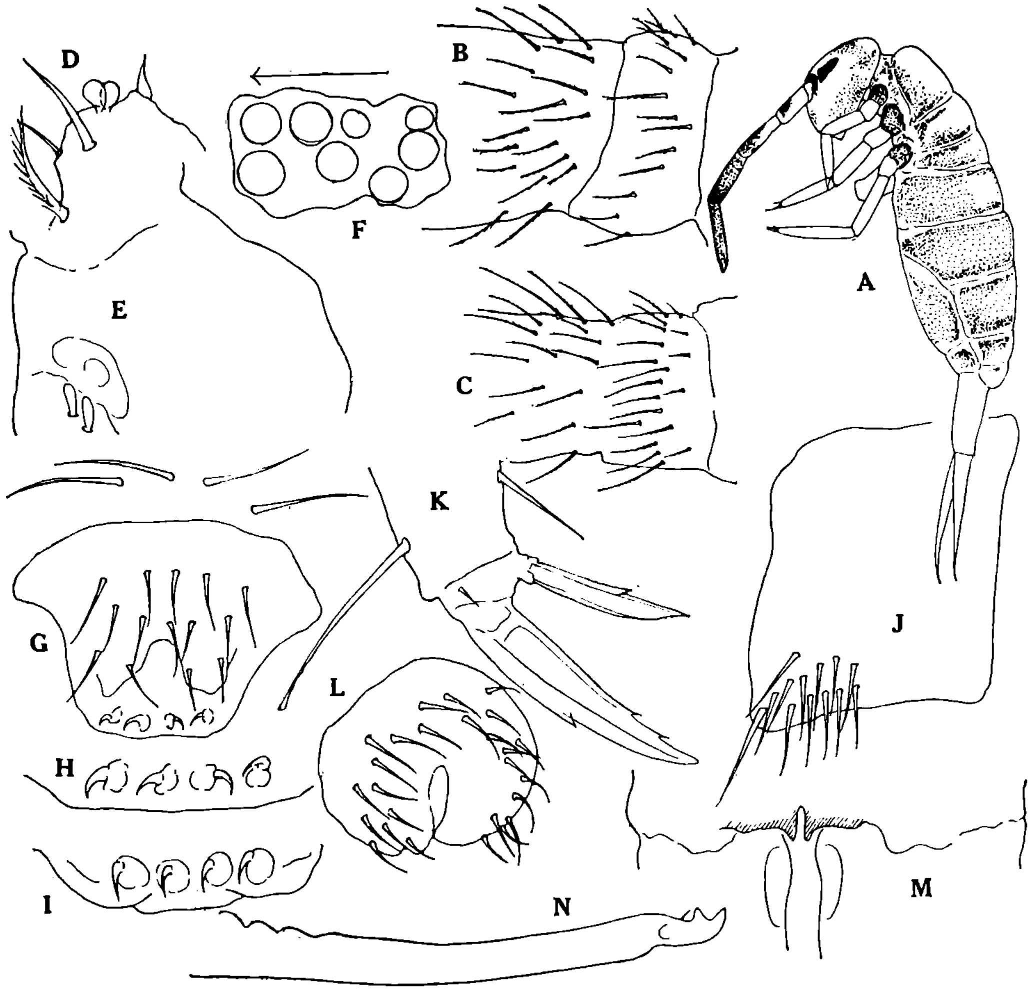

Fig. 7 *Orchesellides poli* sp. n.
A : Habitus, B : Basis of ant. I in lateral view, C : Basis of ant. II in lateral view, D : End of antenna, E : Ant. III-organ, F : Eyes, G : Labrum, H, I : Labral margin, J : Trochanteral organ, K : Hind-claw, L : Male genital opening, M : Marginal manubrial thickening, N : Mucro.

3. Manubrium ventrally with many long, slender, ciliated setae, dorsally with many less slender setae, among which some long, intensely feathered ones are present. Terminal thickening of ventral side with one inner spinous process and not different from other *Orchesellides.* Dentes bearing many short, ciliated setae, proximal ventral side has many extremely long, finely ciliated setae. Long dorsal setae are restricted to 2–3 proximally situated ones, which are intensely feathered to all sides. Distally the dented is strongly converging and dorsal annulation is ending far before the mucro, leaving the smooth portion ca. 6 times the mucro in length. Mucro is curving, equally bidentate and with a basal seta. Body setae are brownish, longer ones are feathered and distally truncate, their location is not to be rectified, being very numerous as in *Orchesella.* Small setae are all curving, unilaterally ciliated. All body segments are not elongated, abd. III : IV : V as 15 : 22 : 10, abd. V being relatively long. Male genital orifice is multisetaceous-type.

The species is dedicated to the Italian traveller MARCO POLO, who has travelled the Wakhan Valley, the foot of Mt. Noshaq to Peking in early times and found *Ovis poli* in Pamir Hights. The species is very near *Corynothrix borealis* TULLBERG, 1876, a dubious species described from Novaya Zemlya and later reported from Siberia in the body colour. In the subsegment of antennae the species is intermittent between *Orchesella* and *Orchesellides,* because there may be found a slight subsegment ventrally upon ant.II in large examples. However, in one fully mature male, no manubrial organ is to be detected.

17. **Orchesellides kabulensis** sp. n. Fig. 8

7 expl. Flower Garden in Kabul, 8. VI 1960, 1 expl. Karezmyl near Kabul, 16. VI 1960, 8 expl. Ishkashim, Wakhan 16.VIII 1960, 13 expl. Faizabad, Badakhshan 6. VII 1960.

Body length up to 2.0 mm. Ground colour whitish yellow, pigmented with black bands. Antennae pale, slightly pigmented distally. Eyes black, connected by narrow transverse band. A narrow dorsal stripe runs through th. II to abd. I. Thoracal tergits have broad lateral stripe marginally. Abd.I-VI each with a transverse band at about the middle of each segment, leaving pale marginal parts both anteriorly and posteriorly. The band is broad and conspicuous upon abd. II, III, while it is variable upon other segments, often abd. IV is pigmented all over. Coxae of all legs lightly pigmented, other extremities and ventral side pale. Antennae 5 segmented, the basal segment (ant. I) having an obscure, short subsegment. Distal end with two rounded apical bulbs and one conical process near by. Ant. III-organ is two short rods in a shallow groove. Ant. ratio is as 14 : 18 : 18 : 24 (ant. I' excluded, being very short). Eyes 8+8, G, H smaller. Labral setae 4/5, 5, 4. Prelabral setae smooth, median intrusion of smooth distal area is broad and attaining almost the median seta of the second row. Labral margin is provided with 2+2 strong, curving and pointed spines, the inner pair is located upon short, longitudinal ridge, the outer pair is situated directly. Unguis with usual number of teeth. Unguiculus is provided with an outer tooth as in case of *Orchesella*. Tenent hair slender, its opposite seta is equal to other species of the genus. Trochanteral organ is composed of ca. 18 rather slender and long, spiny setae. Ventral tube anteriorly with many long, ciliated setae. Posterior face has many shorter, ciliated ones. Tenaculum quadridente, corpus with an anterior seta. Furca with man : as 5 : 8. Manubrium is hirsute on all sides, ventral setae longer, dentes also hirsute, inner ventral setae longer. Dorsal crenulation is ending gradually, leaving smooth area ca. 4.0 times the length of mucro, which is equally bidentate and with a small basal spine. Body setae of all tergites numerous and not to be served for specific determination. They are brownish in colour.

The genus *Orchesellides* BONET, 1930 is probably identical with *Corynothrix* TULLBERG, 1876 (YOSII, 1942), but the use of the latter name is retained for the moment. The new species differs from *O. boraoi* BONET, 1930 from Waziristan by the colouration of the body. The cited species has a pair of patches upon abd. I-III and abd. III, IV are pigmented all over, while in this new species abd. I-V have a broad transverse band and each segment is marginally pale. In

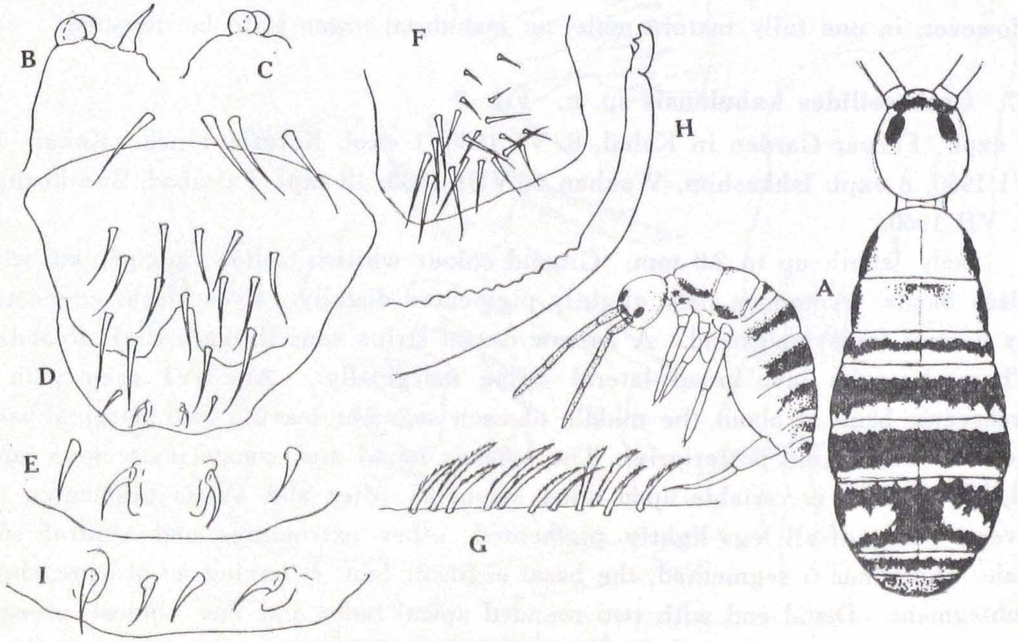

Fig. 8 *Orchesellide kabulensis* sp. n.
A : Habitus, B, C : End of antennae, D : Labrum, E : Labral margin, F : Trochanteral organ, G : Small setae from the dorsum of abd. III, H : Mucro, I : Labral margin of *Orchesellides sinensis* (DENIS) from Okinawa.

this respect *O. kabulensis* is near *O. boruoi* (nec BONET) DENIS, 1936 from Karakorum (DENIS l. c. fig. 9). In *Orchesellides* the body pattern is fairly constant and specific, so long as I have experienced in *O. sinensis* (DENIS, 1929) of Japan and Okinawa.

18. **Sminthurides aquaticus (BOURLET,** 1842) Fig. 9,A.

10 ♀, 4 ♂, Swamp near Kabul, 23. VI 1960

Distribution : Cosmopolitan.

This species is already well defined by STACH, 1956 and other authers, but following notes are to be added from the Afghanic examples : Chaetotaxy of the head as in YOSII, 1961, p. 28, fig. 20, A. Labral setae 6/5, 5, 4, the distal two rows of them are spiny and upon basal papillae. Distal labral margin with 4 short, longitudinal ridges. In contrast to other forms of *Sminthuridae* all species of the genus *Sminthurides* (*aquaticus, pumilis, bidifus*) have not a distinct ledge to separate distal smooth and proximal granulated areas. Labral marginal structure seems to be species-specific within *Sminthurides : S.* cf. *pumilis* has 4 granules, *S. bifidus* has 4 longitudinal ridges, whose proximal end is rounded and granulated (cf. fig. 9 B, C). In *S.* cf. *pumilis* of Calcutta labral setae are 6/4, 5, 4, the median seta of the first row being missed and distal margin is with 2+2 small, rounded tubercles.

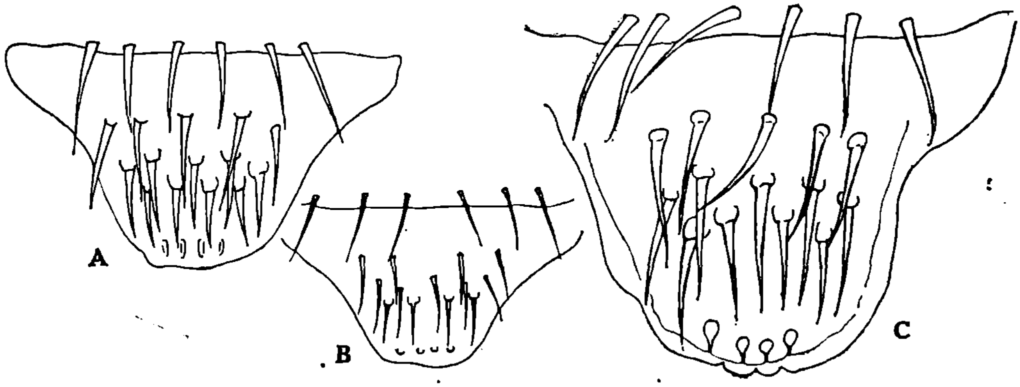

Fig. 9 Labrum of *Sminthurides* spp.
A : *Sminthurides aquaticus* (BOURLET) from Kabul, Afghanistan.
B : *Sphaeridia* cf. *pumilis* (KRAUSBAUER) from Calcutta, India.
C : *Sminthurides bifidus* MILLS from Taegu, Korea.

19. **Sphaeridia** cf. **pumilis (KRAUSBAUER,** 1902)

3 ♀, Karezmyl near Kabul, 16. VI 1960

As has been reported in YOSII, 1963, Afghan species have some of the dental setae converted to spines. But the male example is unknown and the description is retained.

20. **Arrhopalites** sp.

1 ♂, Borak, Badakhshan 18. VII 1960

This example is totally white, without eyes. Vertical setae are not developed. Mucro is with large apical swelling. It is perhaps a species near *Arrhopalites coecus.*

21. **Sminthurinus wakhanicus** sp. n. Fig. 10

2 ♀, Ishikashim, Wakhan 30. VII 1960, 3 ♂, Borak, Badakhshan 9. VII 1960

Two females are poorly preserved and the description is somewhat incomplete. Body length 0.8 mm. General colour uniformly castaneous brown, finely mottled with black pigments. Antennae intensely coloured. Legs and furcula paler. Ant./head as 22 : 17. Ant. ratio as 2 : 4 : 5 : 11. Antennal segments not

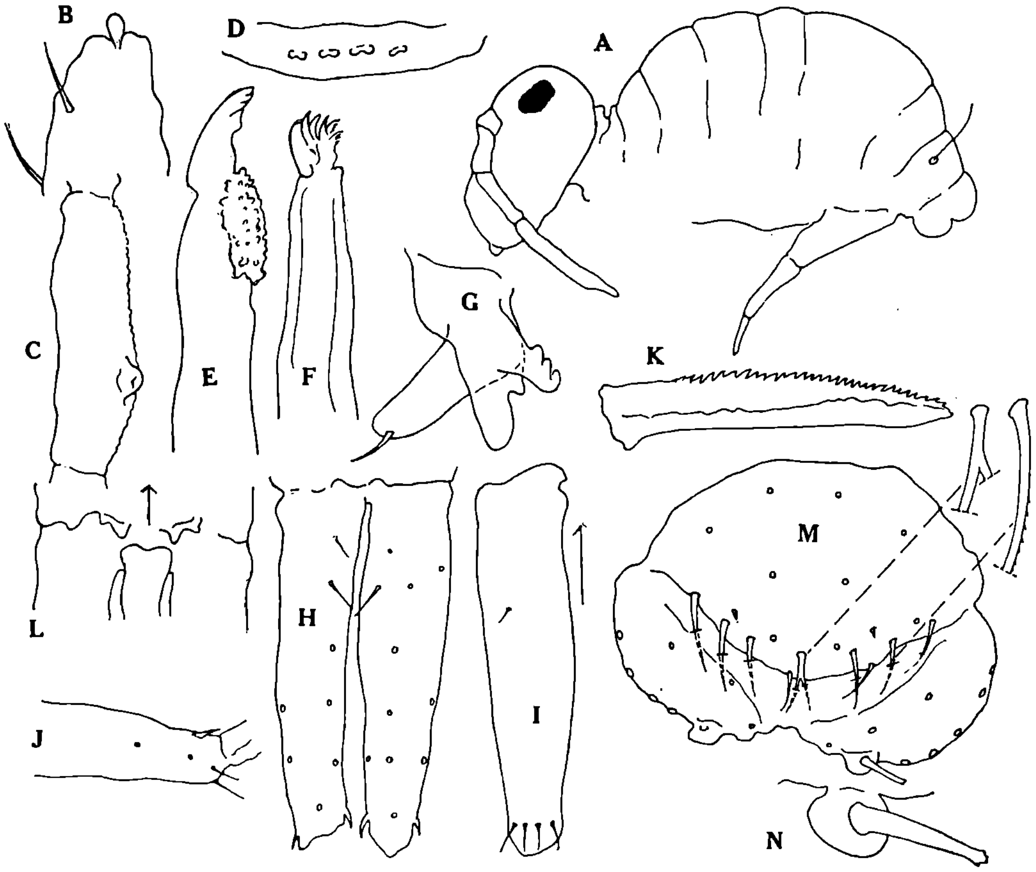

Fig. 19 *Sminthurinus wakhanicus* sp. n.
A : Lateral view, B : End of antenna, C : Ant. III, D : Labral margin, E : Mandible, F : Maxilla, G : Tenaculum, H : Dentes (dorsal), I : Do (ventral), J : Do (lateral), K : Mucro (outer view), L : Manubrial thickening, M : Anal flaps, N. Appendix analis.

annulated. Ant. IV with a rounded apical bulb. Ant.III-organ is a pair of short rods. Lateral swelling of ant.III very conspicuous, irregularly rounded and seemingly not subdivided. Eyes 8+8, intensely pigmented. Infraorbital tubercles represented by a slight circled area of the integument. Labral setae 6/5, 5, 4, all small ?, distal margin with 4 tubercles, which are divided, by large magnification, to 2-3 granules. Mandible and maxilla well represented, the head of the latter lamellate and not reduced. Legs with a rounded process on each coxae. Unguis normal, without tunica and without pseudonychium, but with 2 minute inner teeth. Unguiculus broadly triangular, apically acute, without axial seta and with a slight inner tooth. Tenent hair perhaps present, but not determinable. Rami tenaculi tridentate, basal process large, the corpus is bearing one median process upon which one apical seta is located. Furcula in ratio as 35 : 35 : 18. Manubrium ventrally nude, with broadly bispinose terminal thickening. Dental setae not observed dorsally, but their location is as in fig. H. Ventral setae (fig. I) as 4,- - - -1. The inner distal one is slightly thick. Mucro elongate, apically converging, inner margin finely serrated, outer margin with faint and few serration. Ventral ridge straight. Mucronal pseudonychium absent. Integument is finely but distinctly granulated, body setae are all small and simple. Body segments are marked by the furrow of the integument, both abd.V and VI are independently articulated (*aureus*-type). Upon upper anal flap a_0 is forked, a_{1-3} all winged and $a_{2,3}$ are probably serrated or rugose on one side. sa and sa' simple and long. Lateral flap bears $a_{1,2,3}$. Appendix analis is short and rod-like, apically blunt.

In the body colour and others this species is near *S. brunneus* MAYNARD, 1951 of USA, but both edges of mucro are equally serrated and appendix analis is distally feathered in the cited species. By the intensely granulated integument this species seems to have some relationship to *Stenognathellus denisi* CASSAGNAU, 1953 of France, although mouth parts are not at all reduced.

Distribution : Endemic to Afghanistan

22. **Sminthurinus** sp.

1 ♂, Karezmyl near Kabul, 16. VI 1960

23. **Bourletiella arvalis** (FITCH, 1863)

1 ♂, 1 ♀, Kabul, 19. VI 1960, 1 ♀, Karezmyl near Kabul, 16. VI 1960.

Distribution : Europe, USA, Australia, West Pakistan, Afghanistan (nov.)

II India and Ceylon

1. **Brachystomella contorta** DENIS, 1931

2 expl. Nasic near Bombay, 30. X 1960

Distribution : Costa Rica, Malay (YOSII, 1959), West Africa, India (nov.).

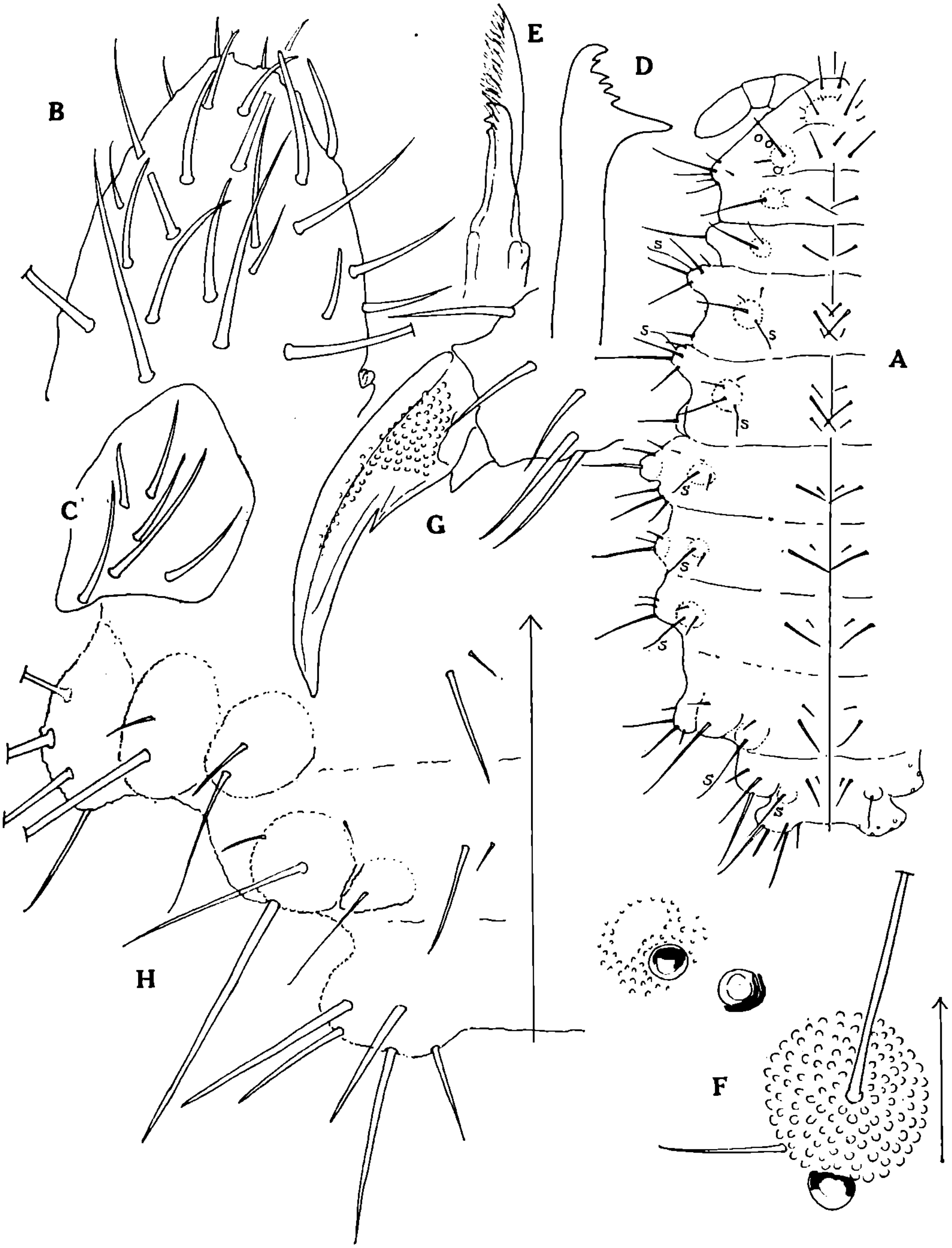

Fig. 11 *Lobella malabarica* sp. n.
A : Dorsal view, B : End of antenna, C : v-seta of ant. III, D : Mandible, E : Maxilla, F : Eyes, G : Fore-claw, H : Abd. IV-VI.

2. **Lobella** (s. str.) **malabarica** sp. n. Fig. 11
11 expl. Malabar Hill in Bombay, 2. X 1960, 10 expl. Kanheri near Bombay, 3. X 1960.

Body length up to 2.8 mm. Colour uniformly brownish red in living and white in alcohol. Antennae shorter than head. Ant. IV has 8 sensory setae in usual arrangement, but 6, 7, 8 are more setaceous than others. Apical bulbs are reduced, they are not observed in 3 examples examined. Eyes 3+3, poorly pigmented and their black colour disappears completely, when treated with lactic acid. Postantennal field distinctly present near the anterior eye. Buccal cone moderately elongated, apically truncate. Apex of mandible triangular, with 6 teeth along the inner side. Maxillar shaft distally bidentate, with an inner lamella far surpassing the shaft and whose margin is strongly fringed. Unguis dorsally carinate, with a conspicuous inner tooth and its inner side is densely granulated basally, but poorly granulated distally. Tibiotarsal setae in usual arrangement, h-row is 8, 8, 7 in number and its median posterior seta is always very short. Ventral tube with 4+4 setae. Furcular hump with 3 setae. Segmental tubercles moderately developed. Upon head antennal, frontal and dorsal tubercles are reduced and represented by setae. Sublateral, lateral and subocular tubercles confluent to a single mass. Upon th. I-abd. V all dorsal tubercles are reduced and represented by 1+1 larger and some smaller setae. Subdorsal tubercles are small, unconspicuous and dislocated laterally. Very characteristic for the species is the fact that a central large seta upon it represents a seta sensualis, accompanied by some smaller normal setae in all abdominal segments. Abd. IV bears 3+3 tubercles in transverse arrangement. Abd. V has 2+2 tubercles, representing a subdorsal (only with one s. s. on it) and lateral tubercle of the segment. Paired tubercles of abd. VI are wide apart to each other. All body setae are slender, simple and pointed on apex.

The species, which is very common in the vicinity of Bombay, is to be distinguished from *N. indica* HANDSCHIN, 1929 (Nilgiris) by the number of eyes, from *Lobella kraepelini* (BÖRNER) (sensu YOSII, 1959) by the chaetal arrangement upon abd. V.

3. **Lobella** (s. str.) **maxillaris** sp. n. Fig. 12
2 expl. Botanical Garden in Calcutta, 14. X 1960.

There are 2 males (A and B). Example A is full grown, but mutilated upon posterior abdominal segments. B is well preserved, but not yet fully mature and the genital field is without setae. Example A (typus): Body length 0.8 mm. Reddish in living and white in alcohol. Frontal part of the head protruded proximally between antennal bases. All tubercles of head well represented and rounded in appearance. Eyes 3+3, black. Postantennal field directly before anterior eyes. Buccal cone moderately developed, truncate on apex. Mandibular head with double rows of 8 teeth. Maxillar shaft is as large as the mandibular one, distally not tapering, but suddenly truncate and with ca. 10 small, well chitinized teeth. Unguis feebly carinate dorsally, with one inner tooth and its inner surface is basally granulated and with many transverse striae at the middle. Dorsal tubercles of the trunk are reduced upon almost all segments and represented by 1+1 larger and 1+1 smaller setae. Other tubercles of each segments are well represented, rounded or mammiform. Body setae are long, straight and simple.

Example B: Length 1.9 mm. All characters above mentioned are almost the same, but the tubercles of the head are rather weakly developed. Frontal and antennal tubercles weakly swollen. Dorsal tubercles of all segments reduced, but other rows of tubercles are well represented and typically beset with setae. Upon abd. IV 3+3 tubercles are arranged in a transverse row, position of s. s. is uncertain. Upon abd. V dorsal tubercles are reduced and the setae upon it are lying near the well defined subdorsal tubercle, which has only one long seta sensualis on it. Paired tubercles of abd. VI are broad, apart to each, low and

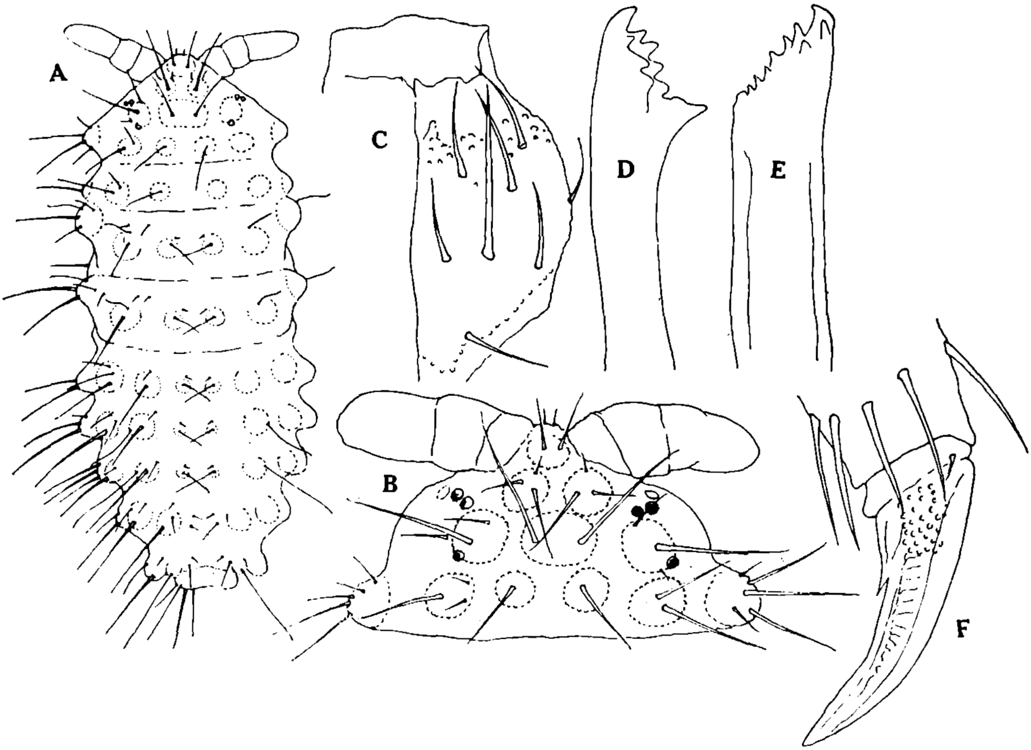

Fig. 12 *Lobella maxillaris* sp. n.
A: Dorsal view, B: Head in dorsal view, C: Buccal cone in ventral view, D: Mandible, E: Maxilla, F: Fore-claw.

the median furrow is almost unperceptible.

The species is interesting in having well developed maxillae. Body form is near *Protanura spinifera* CARPENTER, 1917 of Burma, but mouth parts are quite different.

4. **Lobella (Propeanura) lonavlana** sp. n. Fig. 13.

2 expl. Lonavla near Bombay, 3. X 1960

Length of the body 2.3 mm. Colour red in living and white in alcohol. Antennae shorter than head. Ant. IV with 3 apical bulbs and 8 sensory setae in usual arrangement. Ant. III-organ and d- and v- setae present. Eyes 2+2, very large and unpigmented. Postantennal field small, but distinctly present. Buccal cone strongly pointed on apex. It is protruded from the head. Mandible apically almost tricuspidate and the shaft is slender. Maxilla styliform, with minute lamella attached to the apex. Labium pointed apically and the setae upon it is well differentiated. Unguis carinate, without inner tooth and its inner

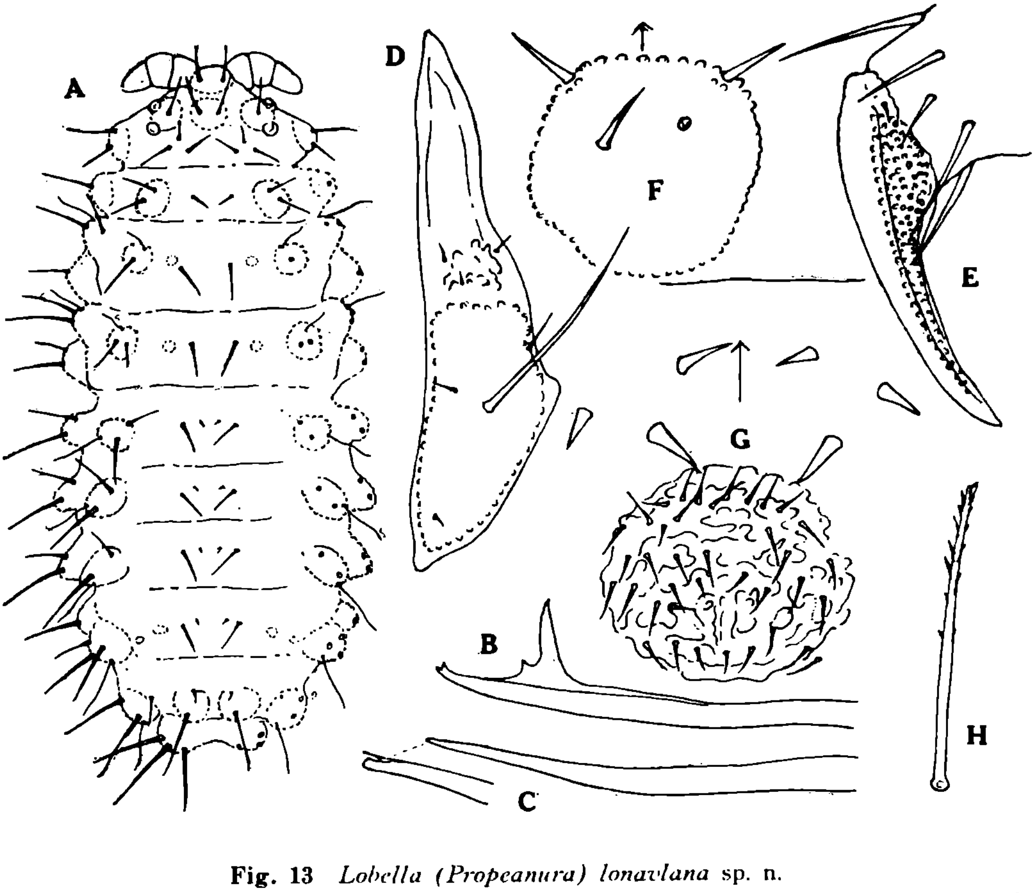

Fig. 13 *Lobella (Propeanura) lonavlana* sp. n.
A : Dorsal view, B : Mandible, C : Maxilla, D : Labium, E : Mid-claw, F : Furcal rest, G : Genital field of male. H : A body seta from ocular tubercle of head.

side is densely granulated from the basis up to the end. Ventral tube has 3+3 setae. Furcal rest is a rounded median swelling of the integument, having 2+2 setae on it. Male genital field is rounded as usual. Anterior to the genital field there exist 3+3 setae almost spiny in appearance. Segmental tubercles well protruded, hemispherical and high. Antennal tubercles of the head absent. Frontal tubercles highly swollen and with 1+1 prominent setae. Ocular tubercle is also swollen. Dorsal tubercle of the occipital region is united to the subdorsal one in one mass, upon which 3+3 setae are situated. Lateral tubercles are also united to one. Upon th. I-abd. IV dorsal tubercles are absent and represented by 1+1 setae, smaller setae of the tubercles are so minute, smaller than an integumentary granule and quite absent upon th. II, III. Subdorsal and other tubercles are normally situated upon th. II--abd. III, although the lateral tubercles of abdominal segments are turned to the ventral side of the body and, therefore, invisible from above. Upon abd. IV subdorsal tubercle is laterally dislocated and fused with sublateral one in one mass. Abd. V has remarkably a pair of well defined dorsal tubercle with 1+1 larger and 1+1 smaller setae, which are located near to each other. Other tubercles are united to one mass, upon which s. s. is to be seen. Paired tubercles of abd. VI are shallowly and broadly furrowed medially. All body setae are whitish, longer ones of the dorsal side are coarsely barberated. s. s. are rather short and simple.

From all other species of *Propeanura*, *L. lonavlana* is characterized by the peculiar tubercles upon head and on abd. IV, V and VI as well as by the structure of unguis.

5. **Lobella (Propeanura) siva** sp. n. Fig. 14

3 expl. Botanical Garden of Calcutta, 15. X 1960, 1 expl. Nasic near Bombay, 30. IX 1960.

Body length 2.5 mm. Colour red in living and white in alcohol. Antennae shorter than head. Ant. IV bears 3 end-bulbs and 8 sensory setae, 2 of which (7 and 8) are semi-setaceous. Ant. III-organ normal, d- and v- setae sensilliform and long. Upon head, both frontal and dorsal tubercles and their setae are reduced. 2+2 unpigmented eyes, one on the ocular tubercle and an another anterior to it. Postantennal field absent. Buccal cone protruded, mandible is distally curving and with very thin lamella in triangular form. This lamellar structure is so thin and hyaline that it is easily overlooked, if it is not properly located. Maxilla styliform. Unguis is dorsally carinate and distally with very few granules. Tibiotarsal chaetotaxy normal, but all setae of h-row are almost equal in length. Ventral tube with 4+4 setae. Furcal rest is represented by a low median hump of the integument, bearing 4 or 5 setae. Body tubercles are reduced : dorsal tubercle is absent upon th. I to abd. IV and represented by 1+1 larger and 2+2 or 1+1 very minute setae. Subdorsal tubercles are vestigially

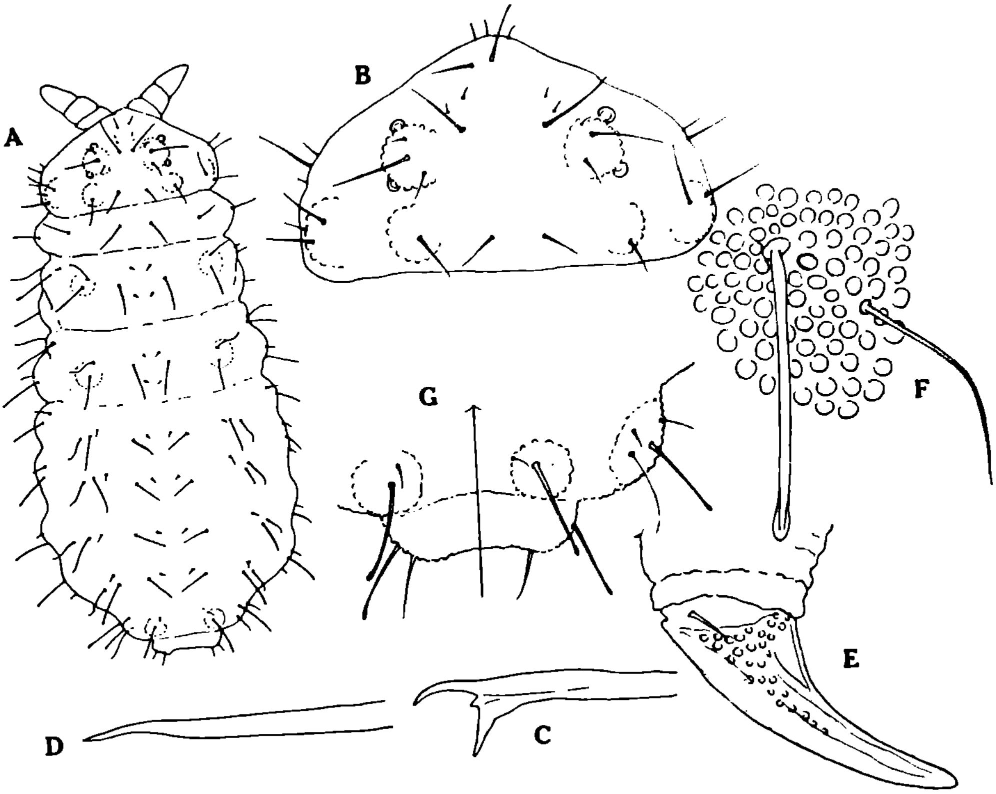

Fig. 14 *Lobella (Propeanura) siva* sp. n.
A : Dorsal view, B : Head, C : Mandible, D : Maxilla, E : Mid-claw, F : Subdorsal tubercle of abd. IV, with one body seta and one s. s. G : End of abdomen.

present or absent completely, if present, they are small and they are small and rounded. Abd. V bearing 2+2 tubercles and a short s. s. is lying a short s. s. is lying on the lateral one. Abd. VI is half concealed by abd. V, furrowed medially or not. All body setae are rather short. Larger setae are, although setaceous, slightly alate and spathulate on apex.

The species is very near the description of *Neanura intermedia* IMMS, 1916 in many respects and, above all, by the absence of the subdorsal tubercle of body segments. But this species is described from the high altitude of the Kumaon Himalaya and body setae are seemingly not differentiated.

6. **Lobella (Propeanura) corallina** (**IMMS,** 1912) Fig. 15

Neanura corallina : IMMS, 1912

2 expl. Colombo, Ceylon 12. X 1960

Body length ca. 2.0 mm. Colour reddish in living and white in alcohol. Antennae shorter than head. Ant. IV with 3 end-bulbs and 8 sensory setae in

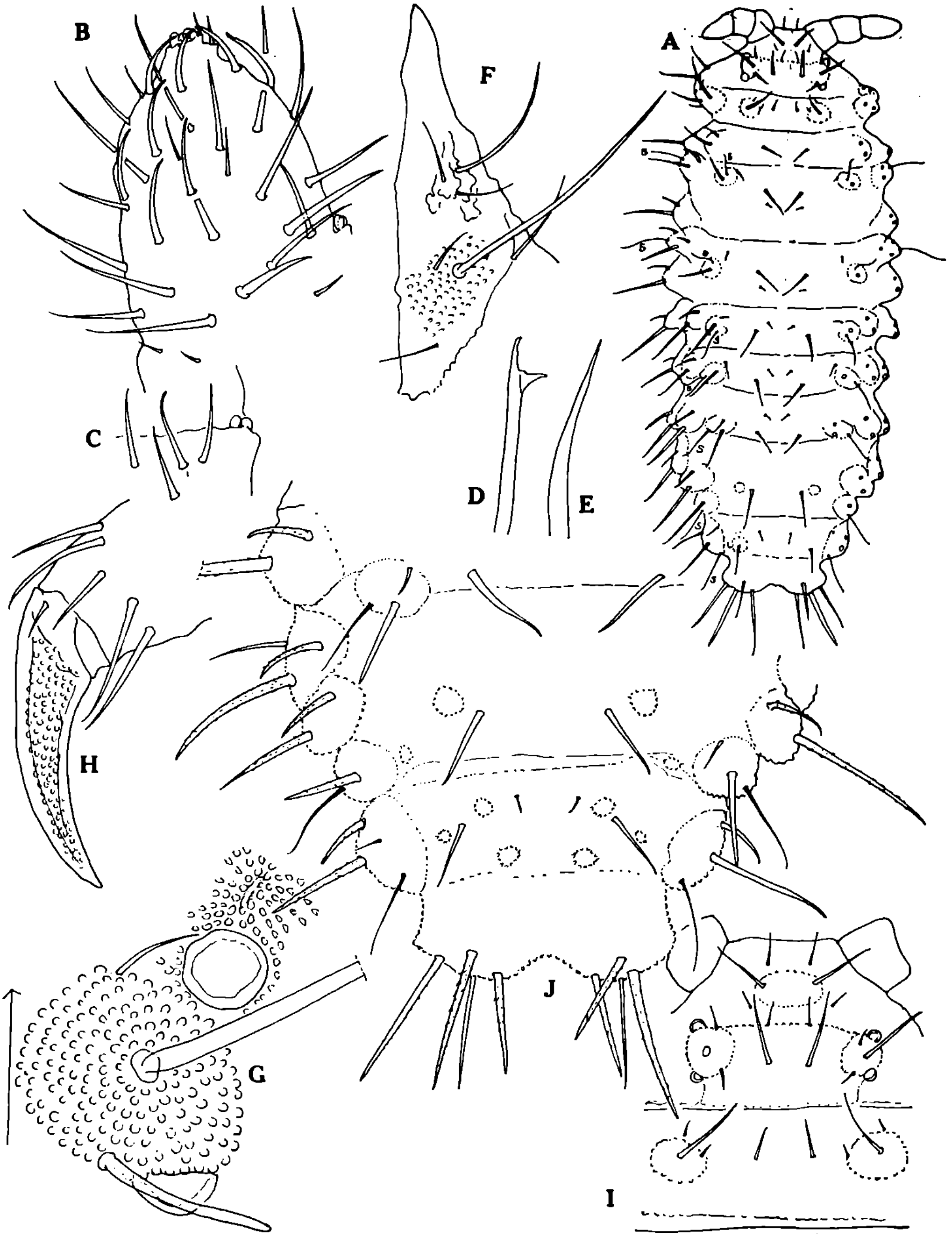

Fig. 15 *Lobella (Propeanura) corallina* (Imms)
A : Dorsal view, B : Antennal end, C : v-seta of ant. III, D : Mandible, E : Maxilla F : Labium G : Eyes, H : Hind-claw, I : Dorsal part of head, J : Posterior part of abdomen.

usual arrangement. They are not especially long. Dorsal (d) and ventral (v) sensory setae of ant. III-organ are long. Eyes 2+2, not pigmented, cornea are rather large. Postantennal field is not present, instead a small area toward which neighbouring integumentary granules are arranged radially, is present. Buccal cone pointed. Labium as in fig. F. Mandible distally forked, maxilla styliform. Unguis dorsally carinate, without any tooth at all and the inner side is densely granulated from the basis until a short before the distal end. Furcula represented by an obscure median hump with 2+2 or 1+1 setae. Ventral tube with 4+4 setae. Upon head a clypeal and a pair of ocular tubercles are present. Antennal, frontal and dorsal tubercles are absent and represented by setae as in fig. I. Dorsal tubercles of all segments of trunk are reduced and represented by setae. Subdorsal tubercles are dislocated laterally, feebly developed and with short s. s. Sublateral and lateral tubercles are also small and sphaerical. Upon abd. IV these 3+3 tubercles are arranged almost in a longitudinal row along the lateral margin of the segment. Upon abd. V dorsal tubercles are reduced and as subdorsal tubercle is united with the lateral one, there is practically only 1+1 tubercle, upon which s. s. is located. Paired tubercles of abd. VI are not very large and well separated by the median groove. Body setae are rather short and often blunt on apex. Some setae, especially those on posterior part of the body, are blunt and sparcely ciliated. s. s. are all short.

IMMS' description and figure of the species does not wholly coincide with the present example. But the feature of unguis, eyes, body characters are concordant with his figure. By the reduction of mouth parts the species must be placed in *Propeanura* YOSII, 1956.

Distribution : Endemic to Ceylon.

7. **Onychiurus** (armatus group) sp.

1 expl. Peradeniya, Ceylon 10. X 1960

An immature female is decidedly different from *O. armatus*, the abd. VI having no anal spines. Body setae are extremely short.

8. **Ballistura bengalensis** sp. n. Fig. 16

2 expl. Botanical Garden in Calcutta, 15. X 1960, 8 expl. Rangoon, Burma, 17. X 1960

Body length 0.8 mm. Colouration uniformly reddish purple upon antennae and dorsal side of the body, while ventral side and other extremities are pale. Antennae slightly longer than head. Ant. ratio as 7 : 12 : 16 : 25. Ant. IV with an obscure apical swelling and numerous minute setae, some of which are curved and alike to sensory ones. Upon other antennal segments setae are larger but scarce. Ant. III-organ is composed of 2 blunt setae each in a shallow deepening, guarded by a slightly modified setae on each side. Labral setae 2/5, 5, 4, distal two rows are upon basal papillae, distal margin without structures. Eyes 8+8, black. Postantennal organ is broadly oblong, not constricted medially and its long axis is ca. 1.5 times the diameter of an eye. Straight unguis is not toothed. Unguiculus triangular, apically acute and with a inner margin basally swollen, where an inner tooth may be present. Tenent hairs 2, 2, 2. They are equal in length and enlarged distally. Ventral tube with 3+3 anterior and 1+1 posterior setae. Rami tenaculi 4-toothed, corpus with one or two median setae. Furcula very well developed. Manubrium is dorsally with many short scattered setae, ventrally smooth and without setae. Dentes is not much tapering distally and practically smooth everywhere. Basal one third of it is inconspicuously subdivided and this basal portion is dorsally with many small setae and ventrally nude, while distal part is intensely beset with dorsal and ventral setae. Mucro is elongate, ventrally carinate and apically bidentate equally. Integument is smooth and covered with many short simple setae (plurichaetotic). No larger setae are differentiated. s. s. absent.

The species must be placed in *Ballistura* by the presence of many ventral dental setae and by the absence of dental dorsal crenulations. Prelabral setae are always 2 in *Ballistura* and 4 in *Proisotoma*. *Ballistura schötti* (DALLA TORRE) has also 2 prelabral setae.

Distribution : India, Burma.

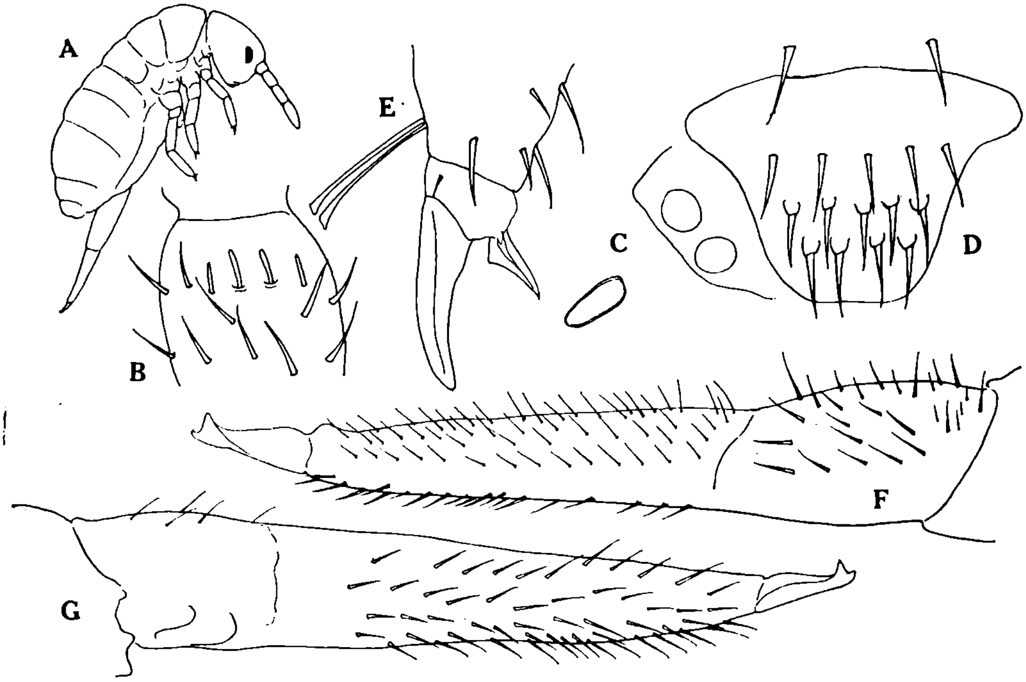

Fig. 16 *Ballistura bengalensis* sp. n.
A : Habitus, B : Ant. III-organ, C : Eyes and postantennal organ, D : Labrum, E : Fore-claw, F : Dens and mucro in dorsal view, G : Ditto in ventral view.

9. **Subisotoma fitchioides** (**Denis**, 1947) Fig. 17

Proisotoma fitchioides : Denis 1947

1 expl. Rangoon, Burma, 17. X 1960, 5 expl. Nasic near Bombay, 29. IX 1960

Body length up to 1.4 mm. Ground colour dirty white, dorsal side of each tergites diffusely dark violet. Segmental margins paler. Antennae and head slightly dark, other extremities are pale. Antennae short. ant./head as 13/14. Ant. ratio as 2 : 3 : 3 : 5. Ant. I, II with 1, 2 row of small setae each. Ant. III-organ is two small rods in a common groove having two minute setae. Ant. IV without end-bulb and with some curving, less differentiated sensory setae. Labrum triangular, with setae 2/5, 5, 4, the prelabral setae 1+1. The second and third row of setae with papillae. Distal margin without structures. Pao. is elliptical, as long as the diameter of an eye. Eyes 8+8, but corneas are so poorly developed that only 5 of them are to be detected, when the example is bleached. Unguis broad, unguiculus triangular, both without tooth. Each tibiotarsus with 2, 2, 2 short, apically knobbed tenent hairs. Ventral tube anteriorly without setae,

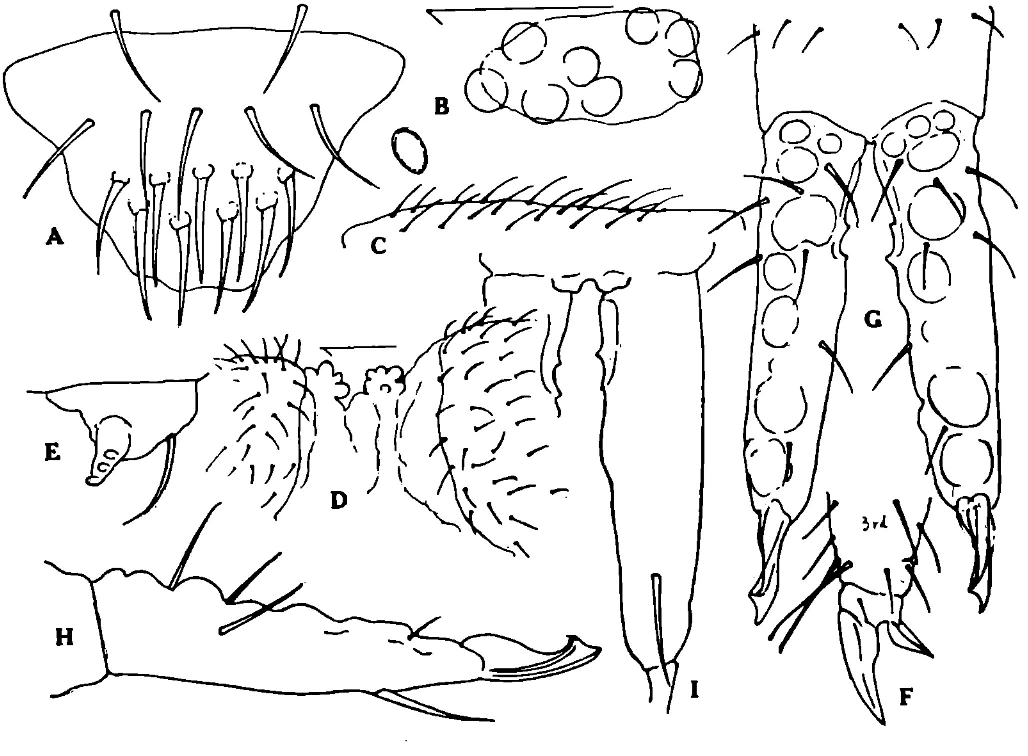

Fig. 17 *Subisotoma fitchioides* (DENIS) from Nasic.
A : Labrum, B : Eyes and postantennal organ, C : Setae of abd. I, D : Granulation upon th. I, E : Tenaculum, F : Hind claw, G : Dens and mucro in doral view, H : Ditto in lateral view, I : Dens in ventral view.

posteriorly with 1+1 setae, lateral flap with 3 setae each. Rami tenaculi tridentate, corpus with one anterior median seta. Furcula in ratio as 5 : 4 : 1. Manubrium ventrally without setae, dorsally with some 20 pairs of small setae. Dentes tapering, dorsally with rough granules or swellings arranged in a fixed order and with 7 setae arranged as 3, 2, 1, 1. Ventral seta 1, distally situated. Mucro is slender, eqally bidentate apically, both margins are lamellate and the inner lamella is broadly rounded near the basis. All body setae are short and simple. Th. I is naturally without tergite, but the place is warty with irregular granules of the integument. Abd. III/IV as 7 : 10. Abd. VI is obscurely separated from abd. V.

The species is probably identical with *Proisotoma fitchi* DENIS, 1933 of Costa Rica.

Distribution : India and Burma.

Notes : There are some problems about the generic nature of the genus *Subisotoma* STACH, 1947 in which the species is probably to be placed. In my present conception *Subisotoma* may be defined to have following characters : Labral setae 2/5, 5, 4 with papillated setae. Ventral tube anteriorly without setae. Postantennal organ simple and small. Tenent hair present or absent. Dentes dorsally granular, with integumentary swellings and with few number of setae, ventrally with 1 seta only (always ?). Mucro bidentate and with lamellar margins. The geuus is to be distinguished by the structure of labrum from *Proisotoma*, which has 2+2 prelabral setae and 2+2 tubercles or ridges along labral margin. Genotypical species of *Subisotoma* is *Isotoma pusilla* SCHÄFFER, 1900. Some of the species of this genus have regressing tendence and number of eyes and the distinction of mucro to dentes are becoming insignificant.

10. **Isotomina thermophila** (**AXELSON,** 1900) Fig. 18

2 expl. Lonavla near Bombay, 3. X 1960, 1 expl. Kanheri near Bombay, 2. X 1960, 3 expl. Nasic near Bombay, 30. IX 1960, 1 expl. Malabar Hill, Bombay, 29. IX 1960, 15 expl. Rangoon, Burma 17. X 1960, 1 expl. Uh Lai, Formosa 24. X 1960.

Of this well known species following notes are to be added from the observation of Burmese specimens : Length up to 0.7 mm. Colour uniformly gray. Antennae slightly dark, other extremities pale. Antennae as long as head. Ant. ratio as 24 : 32 : 34 : 50. Ant. IV distally with a low terminal bulb and some long, curving sensory setae. Ant. III-organ is a pair of blunt small sensillae situated side by side in a common groove. Ant. I with a row of small setae accompanied with p-seta. Labral seate 4/5, 5, 4, the second and third row with heavy sockets. Smooth distal area is delimited from proximal granular area by a transverse line. Eyes 8+8, subequal, strongly pigmented black to form a common eye-patch. Postantennal organ broadly elliptical, the long axis about 2.5 times the diameter of an eye and with a distinct notch on both sides. Unguis carinate, without tooth. Unguiculus, triangular, with a inner margin broad basally and swollen at the middle. No tenent hair. Ventral tube anteriorly without setae and posteriorly with 1+1 strong setae. Lateral flap bearing 5 setae each. Tenaculum quadridentate and corpus with 1 median seta. Furcula well developed, but not reaching the ventral tube. Manubrium is dorsally with ca. 20 small setae and ventrally with 1+1 large setae near the dental end. Manubrial thickening is remarkably rounded on inner side. Proximal end of manubrium, the articulation to the sternum of abdomen has a pair of strong hooks as in fig. G. man : d as 3 : 5. Dentes ventrally with about 20 rather strong setae in 3 longitudinal rows. Dorsally it is indistinctly crenulated about 1/2 of the whole length. 3 basal, 3 inner and 2 outer setae are situated on both margins of the crenulation and its position and number is constant within all examples examined. They are, however, all very feeble. Mucro short, equally bidentate. All body setae simple, small. Abd. IV/V is demarcated distinctly by the chitinous suture on dorsal side.

Distribution : Cosmopolitan, already found from Europe, Central America and Australia.

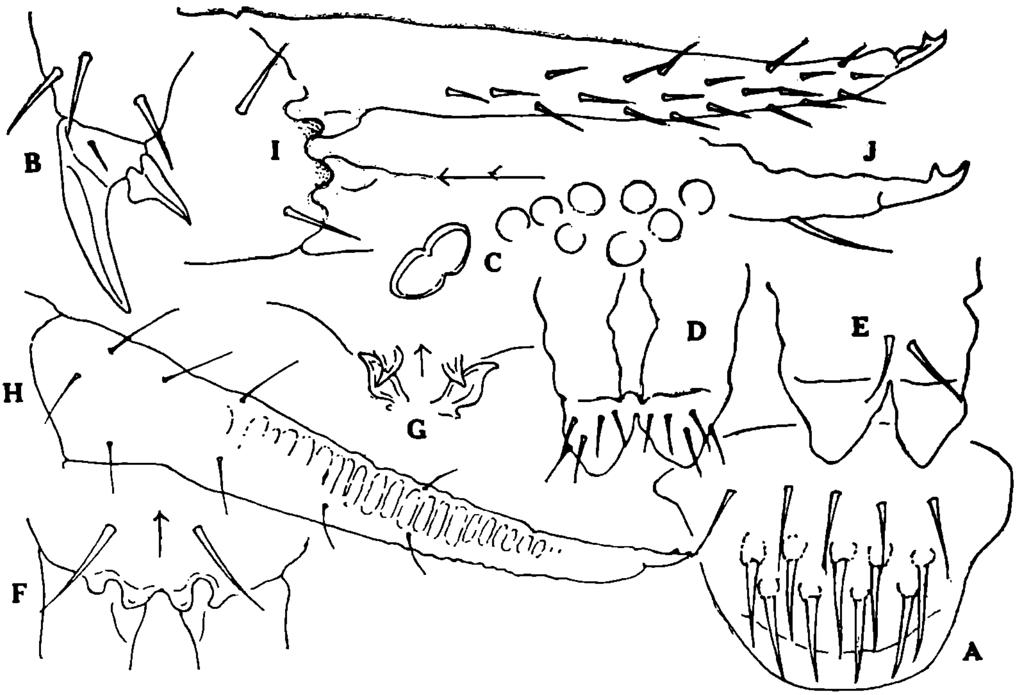

Fig. 18 *Isotomina thermophila* (AXELSON) from Rangoon
A : Labrum, B : Mid claw, C : Eyes and postantennal organ, D : Ventral tube (anterior face), E : Ditto (posterior face), F : Terminal thickening of manubrium, G : Hooks at the basis of manubrium, H : Dentes in dorsal view, I : Dentes in ventral view, J : Mucro.

Notes : The difference between *Proisotoma* BÖRNER, 1901 and *Isotomina* BÖRNER, 1903 may be best determined by the structure of labrum. In *Proisotoma* all setae are not papillated and with 4 marginal ridges.

11. **Axelsonia nitida** (**FOLSOM,** 1899) bona spec. Fig. 19

15 expl. Malabar Hill, Bombay (Mangrove Bush along the sea coast)

Axelsonia BÖRNER, 1907 is the halophilous genus widely distributed all over the world and recognized to be composed of one species *A. litoralis* MONIEZ, 1890, until a second species : *A. tubifera* STRENZKE, 1958 is recovered from the Brazilian Mangrove. Upon inspecting the Indian examples I have come to the result that the species *A. litoralis* must be divided into two species at least.

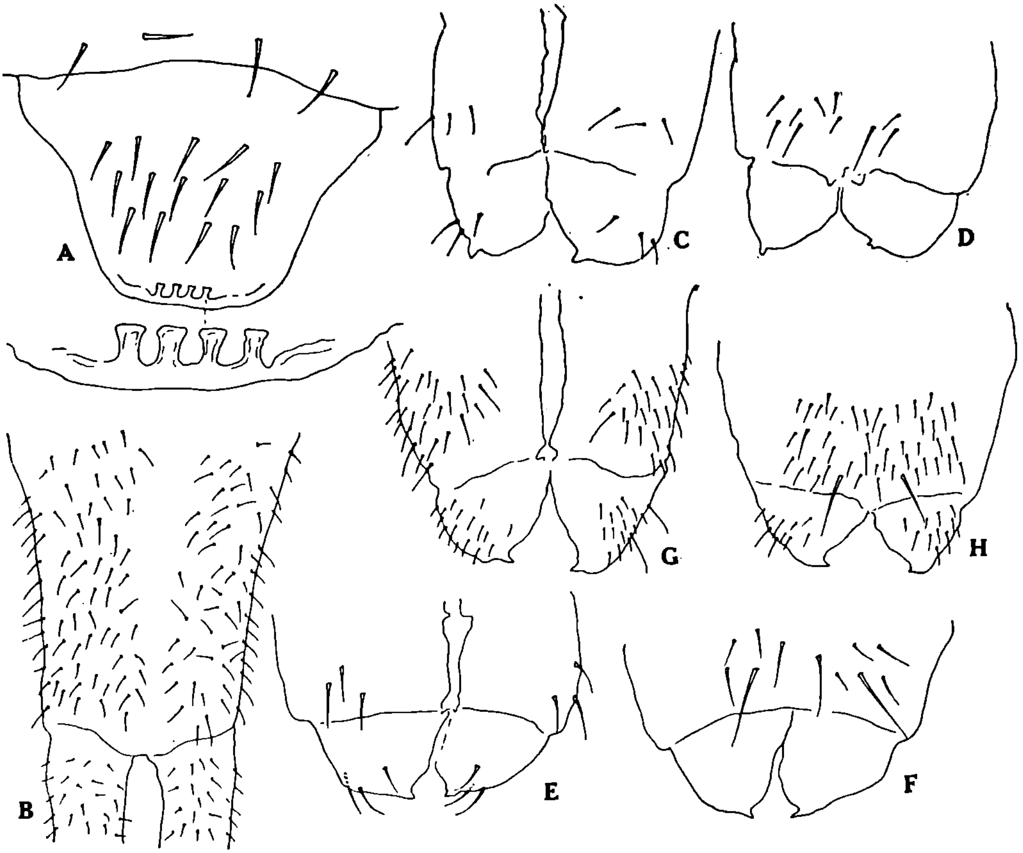

Fig. 19 *Axelsonia nitida* (FOLSOM) from Bombay
A : Labrum and labral margin, B : Dorsal view of manubrium and dentes., C : Ventral tube (anterior face), D : Ditto (posterior face). E, F : Ventral tube of *A, nitida* from Japan,
G, H : Ventral tube of *A, litoralis* (MON.) from France.

A : Male with a special blunt setae upon abd. VI

.... *tubifera* STRENZKE, 1958, Brazil

AA : Male without such seta.

B : Lateral flap of the ventral tube with numerous setae (fig. G, H).

.... *litoralis* (MONIEZ, 1890), France

BB : Lateral flap with 3 setae each (fig. E, F).

.... *nitida* (FOLSOM, 1899), Japan, India, New Caledonia.

Some additional notes about the morphology of *Axelsonia* spp. must be added. Labral setae 4/5, 5, 4. Labral margin with 4 high ridges, they are quadrangular in shape and like streaks. Rami tenaculi quadridentate and corpus with ca. 10 setae (in *litoralis* more than that). Manubrium both dorsally and ventrally with many setae, none of them are modified. Dentes drosally with numerous setae at the proximal part. Mucro quinquedentate, an apical, an ante-apical, a pair of proximal and one small subapical (=ventral). *Axelsonia thalassophila* BÖRNER, 1907 is perhaps equal with *A. nitida.* The genus is the near relative of *Isotomurus* to judge from the state of the dental setae.

12. **Isotomiella minor** (SCHÄFFER, 1896) Fig. 20, A, B, C.

1 expl. Nasic near Bombay, 29. IX 1960, 3 expl. Lonavla near Bombay, 3. X 1960.

The Indian examples coincide in all details with Japanese forms. Some additional diagnosis of the species is given below : Ventral tube anteriorly with 4+4 setae in two rows. Posterior face with 2+2 setae. Lateral flap each with

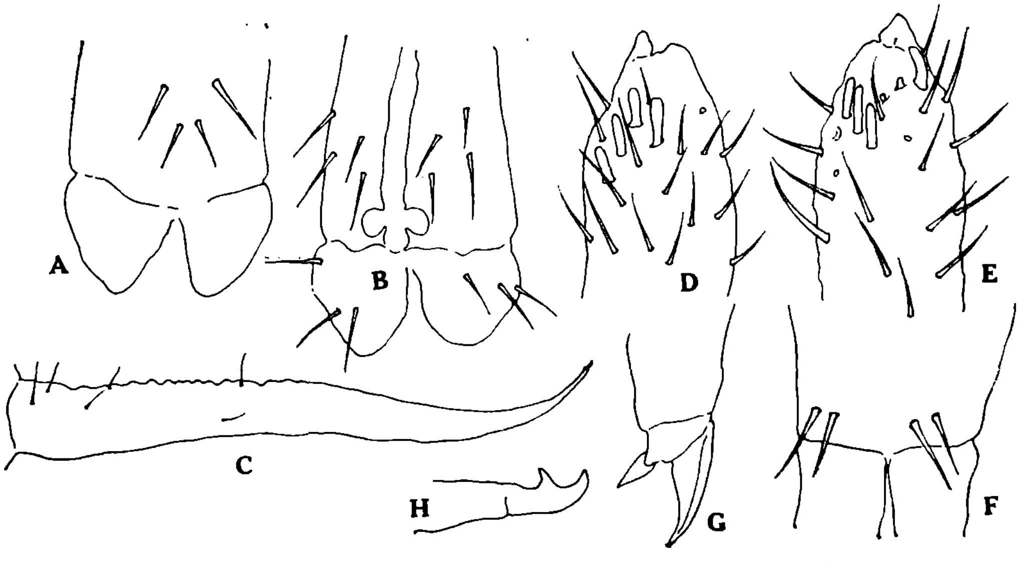

Fig. 20 A–C : *Isotomiella minor* (SCHÄFFER) from Nasic

A, B : Posterior and anterior face of ventral tube. C : Dorsal chaetotaxy of dentes.

D–H : *Isotomiella* sp. of Ceylon

D, E : End of antenna, F : Manubrial ventral setae, G : Mid-claw, H : Mucro.

3-4 setae. Manubrium ventrally with 5+5 and dorsally with some 10 weak setae. Dentes indistinctly annulated, ventrally with more than 40 setae in three longitudinal rows and dorsally with 6 feeble setae arranged as basel 2, parabasal 2, median 2.

Distribution : Cosmopolitan, being found from Europe, North and South America, Asia and New Zealand.

13. **Isotomiella** sp. Fig. 20, D - H.

1 expl. Peradeniya, Ceylon, 10. X 1960

Body length 1.2 mm. White. General characters as in *I. minor*, but ventral setae of manubrium 2+2. Mucro with 2 teeth. Ant. IV distally with 4 blunt sensory rods. As there is only one example at hand, it is not to be decided, whether it represents a new species or a teratological individual.

14. **Isotomurus** sp.

1 expl. Nasic near Bombay, 29. IX 1960

This is a banded species, referable to the *balteatus*-group of the genus, although the pigment is paler than in typical form. Ventral tube is provided with 3 setae upon lateral flap and this character contradicts with all known forms of the *balteatus*-group. The presence of such form as this may indicate the necessity of studying the group more intensively.

15. **Seira cinerea** sp. n. Fig. 21

1 expl. Malabar Hill, Bombay, 3. X 1960

Body length 1.4 mm. Ground colour bluish gray, slightly brown with scales. Antennae slightly darker upon proximal two segments. Head coloured ventrally. Th. II anteriorly and th. III-abd. II posteriorly with coloured margins. Suffusion of bluish gray pigments covering laterally from th. III to abd. V and colour of both sides is connected dorsally upon abd. III, where the segment is darkly pigmented all over. Furthermore, ventral side of the body, ventral tube and legs (coxa, trochanter and femur of each legs) darkly pigmented. Furca slightly pigmented basally. Ant./head as 8 : 3. Ant. ratio as 25 : 38 : 35 : 65. Ant. IV indistinctly annulated. Scales present from the base until to the middle of ant. III. Eyes 6+6, in a common black eye patch. Legs scaled until tibiotarsus. Unguis straight, with one inner basal and two inner distal teeth. Unguiculus lanceolate, acute on apex. Tenent hair rather long, robust and apically dilated. Coloured ventral tube is anteriorly scaled and with 2+2 terminal setae. Posterior face only with 1+1 terminal, smooth setae and one small spine is also observed. Lateral comb-like setae 4+4, all short and spiny. Trochanteral organ composed of ca. 25 short setae in a quadrangle. Furcal ratio as 7 : 8. Manubrium and dentes ventrally scaled and dorsally with many, long, ciliated setae. No special structure

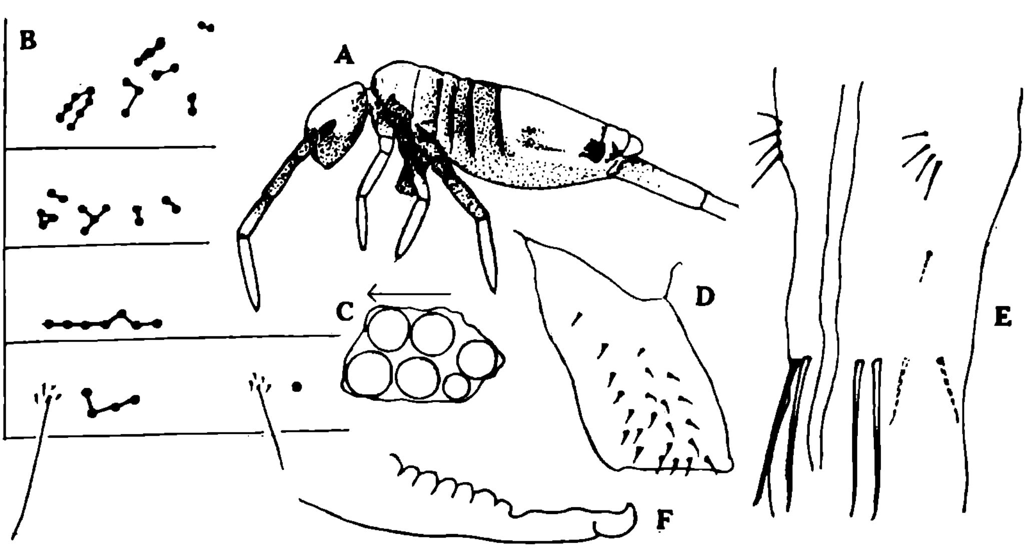

Fig. 21 *Seira cinerea* sp. n.
A : Habitus, B : Chaetal arrangement, C : Eyes, D : Trochanteral organ,
E : Anterior face of ventral tube, F : Mucro.

upon dentes. Dental annulation abruptly ending and mucro falciform. Abd. III/IV as 2 : 9. Larger body scales are brownish pigmented. Arrangement of larger body setae is as in fig. B, it is alike to that of *Seira indica* (RITTER), but different upon th. III and abd. I. Setal arrangement of ventral tube is quite different from it. The body colour is near *Pseudosira evansii* (BROWN, 1926) from Mesopotamia. Thus the form must be a member of *S. squamoornata*-complex of the mediterranean area.

16. **Seira indica** (**RITTER**, 1911) Fig. 22
Callistocyrtus indicus : RITTER, 1911
Pseudosira indica : BONET, 1930
Syn. ? *Drepanura punctata* : RITTER, 1911
Syn. ? *Lepidocyrtinus unifasciatus* : DENIS, 1936
7 expl. Kanheri near Bombay, 2. X 1960, 29 expl. Malabar Hill, Bombay 3. X 1960.

Body length 1.8 mm. Slender in general form. Body colour is determined by the distribution of (1) brownish scales, (2) bluish pigments and (3) yellowish brown pigments of the integument. There are two sorts of scales on the trunk. Hyaline ones are upon head and on some places of the body, including all extremities, while heavily brownish scales are upon th. II (post.) and on all segments posterior from abd. II. Abd. II and III are richly beset with such brown ones. Yellowish brown pigments cover the whole of abd. II, III as well as some spots of head and th. II (ant.), accompanied by bluish pigments, the latter appearing also on posterior margin of abd. IV. The variable nature of bluish pigments is very great and yellowish pigments of the body are sensitive to light, that yellow patches may completely disappear within one year of preservation in alcohol. Ant./head as 3 : 1. Ant. ratio as 7 : 9 : 9 : 45. Antennae scaled dorsally until ant. III. Ant. IV faintly annulated. Eyes 8+8, A, B larger and G, H smaller than others. Each cornea is separately pigmented. Mesonotum is projecting over the head. Unguis and unguiculus as stated by BONET, 1930. Legs scaled until the middle of each tibiotarsus. Trochanteral organ feeble, composed of ca. 20 small setae in a quadrangular area. Ventral tube anteriorly with 2+2 terminal and some 2+2 larger setae. Lateral comb-like setae consisting from 1 larger and 2 smaller setae. Posterior face has remarkably only 1+1 short terminal setae. Both faces are strikingly scaled. Furca well developed. Manubrium dorsally with many ciliated setae. Ventrally it is densely scaled with rounded scales and some 3+3 setae in a longitudinal row. The distal end has 6+6 minutely ciliate, spiny setae, accompanied by larger, elongate scales. Dentes dorsally with crenulation ending abruptly near the mucronal end. Laterally it has many slender, filiform setae. Ventral scales hyaline and small. Inner basal part of dentes has a set of ca. 2+2 low, rounded blister of the integument, which are not so distinct as in *Afroseira* YOSII, 1959 of South Africa. Mucro is typically falciform. Chaetotaxy is rather complicated, but almost fixed. serving to the identity of the

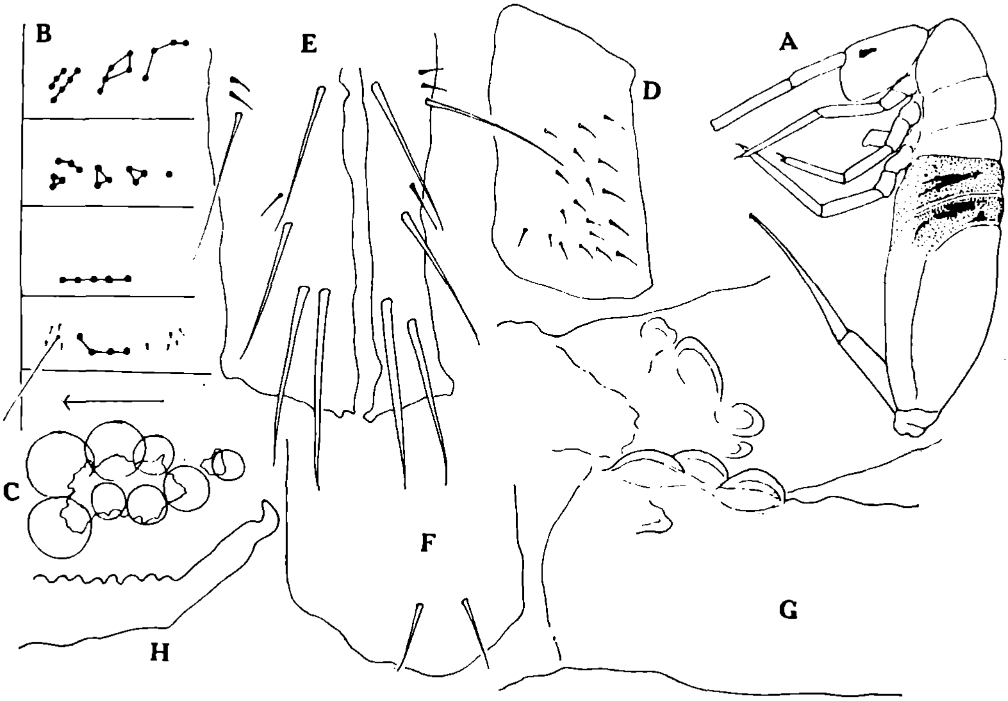

Fig. 22 *Seira indica* (RITTER) from Bombay
A : Habitus, B : Chaetal arrangement, C : Eyes, D : Trochanteral organ, E : Ventral tube (anterior face), F : Do (posterior face), G : Basis of dentes, H : Mucro.

species.

Drepanura punctata RITTER, 1911 from Bombay is probably a young and uncoloured example of this species, in which body scales are fallen off. His description "Je acht Ocellen in zwei Längs- und 4 Querreihen, die beiden Proximalocellen klein" is perhaps exactly observed. For his examples from Paradeniya, Ceylon an another species must be suspected. *Lepidocyrtus unifasciatus* DENIS, 1936 from South India is also probably a synonym of the present species. It has the black band of the body upon abd. III, but not on abd. II and eyes are poorly pigmented.

17. **Seira lateralis** sp. n. Fig. 23

4 expl. Malabar Hill, Bombay, 3. X 1960

Body length 1.0 mm., rather small for the genus *Seira*. Ground colour brownish yellow. Antennal segments deeply blue on their distal end. Ant. IV diffusely pigmented all through the length. From the antennal basis until to abd. V a broad conspicuous stripe runs along the dorso-lateral part of each segment. It is composed of mosaic assembly of pigments and often interrupted near the fore margin of each segments. Ant./head as 13 : 4. Ant. ratio as 18 : 30 : 30 : 40. Ant. I, II proximal dorsally with some scales. Eyes 8+8, rather faintly pigmented and A, B are much larger than others. Legs unscaled. Unguis straight and

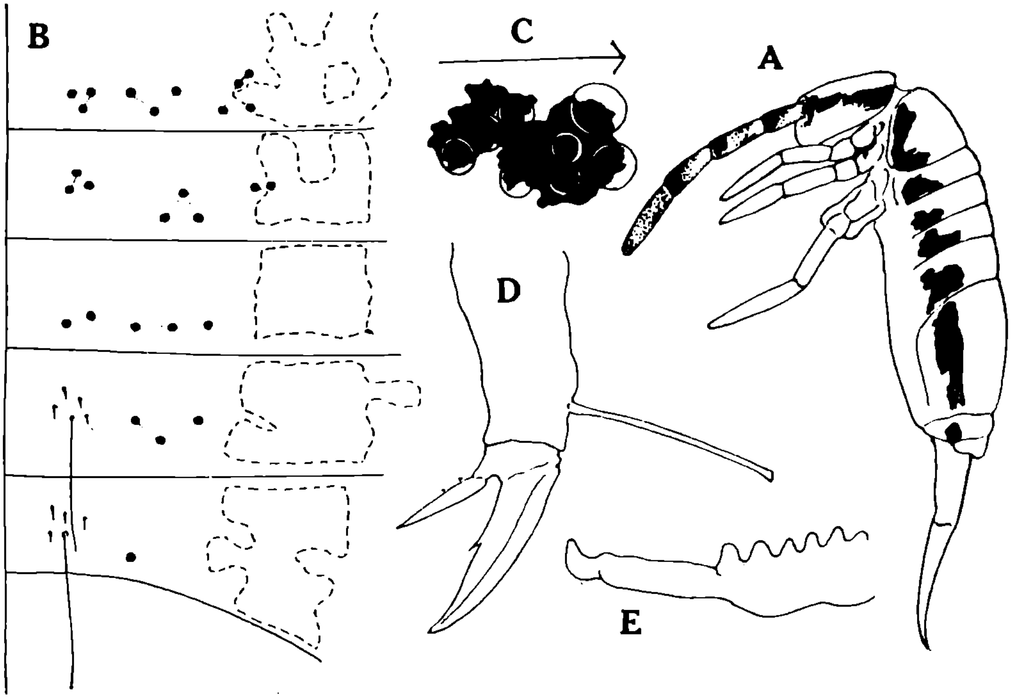

Fig. 23 *Seira lateralis* sp. n.

A : Habitus, B : Chaetal arrangement, C : Eyes, D : Mid-claw, E : Mucro.

with only one inner basal tooth. Unguiculus acute and lanceolate. Tenent hair long and dilated apically. Trochanteral organ is composed of 6 setae in L-arrangement. Ventral tube not well investigated, but probably with 2+2, 2+2= 4+4 setae anteriorly and with 1+1 setae posteriorly. Furca normal. Manubrium and dentes ventrally scaled, mucro falciform and without any appendage upon dentes. Body scales are rounded, brownish upon head and trunk to form a brownish median longitudinal streak. Chaetotaxy is in a fixed pattern upon each segments as in fig. B, which is very characteristic for the species.

All 4 examples at hand are small and they might be all in a juvenile stage. But as the body pattern and chaetal arrangement is very peculiar, it can not be mixed with any other *Seira* species hitherto described.

18. **Acrocyrtus heterolepis** (YOSII, 1959)

21 expl. Botanical Garden in Calcutta, 15. X 1960, 1 expl. Victoria Peak, Hongkong, 25. X 1960, 2 expl. Uh-Lai, Formosa 24. X 1960.

After examining many good examples from various localities, more is known about this interesting species. The modified frontal setae of the head are not scaly, but claviform and their surface is densely ciliated. Tenent hair is distally enflated, but it is sometimes very indistinct. Body colour varies considerably. Antennae are always deeply bluish, but body is either pale or diffusely pigmented with bluish pigments as in my previous description.

Since the species is so widely distributed in tropical Asia, it might be identical with the species already described by senior authors. If we neglect the presence of these modified claviform setae of the head, then *A. heterolepis* may be identical with *Lepidocyrtus aequidentatus* DENIS, 1948 of Annam, while *Acrocyrtus solomonensis* YOSII, 1960 is identical with *Lepidocyrtus parvidentatus* SCHÄFFER, 1898 and *Lepidocyrtus heterophthalmus* CARPENTER, 1904.

Distribution : Malay, India, Hongkong, Formosa.

19. **Acrocyrtus cryptocephalus** (**HANDSCHIN**, 1929) Fig. 24

Lepididocyrtus cryptocephalus : HANDSCHIN, 1929.

15 expl. Kanheri near Bombay, 2. X 1960, 10 expl. Nasic near Bombay, 30. IX 1960, 12 expl. Malabar Hill in Bombay, 5. X 1960, 50 expl. Lonavla near Bombay, 4. X 1960.

Body length 2.5 mm. Ground colour white, scattered with blue pigments especially upon distal half of antennae, abd. II, III and upon posterior border of abdomen. But some examples are also with pigments upon th. II, and in others these body pigments are very scarce. Antennal basis, furca (proximal), and femur of each legs show some blue colouration. Ant./head as 2 : 1. Ant. ratio as 6 : 15 : 14 : 20. Ant. I and II dorsally denuded of setae and heavily beset with scales. Frontal setae of head elongated. Eyes 8+8, black. Labrum with setae

4/5, 5, 4 all of them are smooth and rather slender. Median intrusion of distal area is very narraw, wedge-shaped and distal margin has always 1+1 very small spinules. Mesonotum strongly projecting over the head. Th. II : III as 5 : 2, abd. III : IV as 3 : 20. All legs intensely scaled until distal end of each tibiotarsus. Unguis slender, with paired basal and one distal inner tooth. Unguiculus acute, acuminate and truncate on inner side, leaving a notch at about the middle. Tenent hair long and distally knobbed. Coxal setae as I-12, IIa-11, IIp-13, III-15. Trochanteral organ composed of ca. 35 setae in a quadrangle, marginal setae considerably long. Ventral tube anteriorly with 2+2 larger terminal and some 10 pairs of smaller setae, all ciliated. Posteriorly there is a verticillating tuft of numerous setae accompanied by some small peg-like ones, terminal 1+1 setae are more or less spinous than others. Furca in ratio as 7 : 6. Manubrium dorsally hirsute, laterally with a row of modified, blunt, ciliated setae. Ventral terminal setae 3+3, a pair of which is larger than others. Dentes laterally with a row of modified, blunt, ciliated setae. Appendix is small but typically pointed for *Acrocyrtus*. Mucro bidentate and with a spine as usual. Body scales are uniformly brownish white in colour. Accessory scales of s. s. are lanceolate and somewhat coloured.

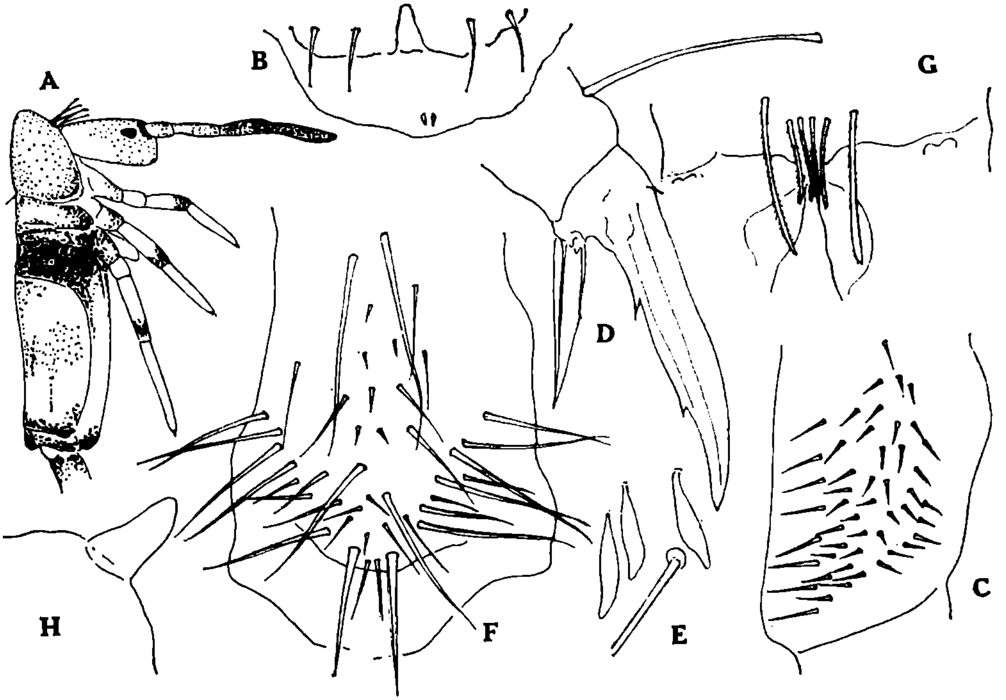

Fig. 24 *Acrocyrtus cryptocephalus* (HANDSCHIN)
A : Habitus, B : Labral margin, C : Trochanteral organ, D : Hind claw, E : Accessory scales of s. s. from abd. III, F : Ventral tube (posterior face), G : Ventral terminal setae of manubrium, H : Basal appendix of dentes.

The form differs from HANDSCHIN's description in the absence of one minute inner distal tooth of unguis, otherwise the identity is fairy assured by the thorough concordance of body colour and others. Morphologically the species is characterized by the labral margin, ventral tube with peg-like setae and by the form of unguiculus.

20 **Acrocyrtus** sp.

12 expl. Kanheri near Bombay, 2. X 1960, 25 expl. Nasic near Bombay, 30. IX 1960, 18 expl. Calcutta, 15. X 1960.

The description of this species will be given in my subsequent paper.

21. **Ascocyrtus scaber** (**RITTER**, 1910)

Lepidocyrtus scaber : RITTER 1910

syn. nov. *Lepidocyrtus suborientalis* : DENIS 1948, YOSII 1959

20 expl. Peradeniya, Ceylon, 10. X 1960, 1 expl. Calcutta, 15. X 1960, 2 expl. Uh Lai, Formosa 24. X 1960.

RITTER's type examples preserved in the Museum of Natural History, Vienna have been investigated by me in the Year 1941, during my visit of the Museum. Now the topotypical specimens are also obtained. They reveal the total identity with the species which I have redescribed as *Lepidocyrtus* (*Basicyrtus*) *suborientalis* DENIS in 1959 from Singapore. Following notes are to be added for my desciiption of that time : Labral setae 4/5, 5, 4, prelabral setae ciliated, median intrusion of smooth area narrow and wedge-shaped, distal labral margin with two pairs of tubercles, the median pair of which is rounded and slightly conical. Lateral flap of ventral tube with many ciliated setae and some 7 smooth, larger setae. In the first sight, the species is very near *L. orientalis* HANDSCHIN, 1929, but dental appendix is quite rounded and prelabral setae are ciliated, the last character seems to be common for all species of *Ascocyrtus* so long as I have hitherto investigated.

Distr. : Ceylon, India, Singapore, Vietnam, Formosa.

22. **Lepidocyrtus** cf. **caeruleicornis** **BONET**, 1930

3 expl. Kanheri near Bombay, 2 X 1960, 2 expl. Malabar Hill, Bombay, 4. X 1960, 4 expl. Botanical Garden in Calcutta, 15. X 1960.

Details of this species will be given in my next paper.

23. **Alloscopus tetracantha** **BÖRNER**, 1906

Yosii, 1959.

3 expl. Calcutta, 16. X 1960.

Distr. : Malay, Singapore, Java, India (nov.), New Britain.

24. **Dicranocentrus indicus** Bonet, 1930 Fig. 25

45 expl. Kanheri near Bombay, 2. X 1960, 32 expl. Nasic near Bombay, 30. IX 1960, 4 expl. Uh Lai, Formosa 24. X 1960

Body length up to 3.2 mm. Antennae reddish violet. Eyes black. Mesothorax fringed with pigmented margins anteriorly and laterally. All body segments with a diffuse, transverse, bluish band near the posterior margin. Extremities are pale. Antennae 5 jointed, ant. I being subdivided. The ratio is, therefore, 15 : 55 : 35 : 75 : 210. The first three segments with brownish scales dorsally. Ant. III hirsute, with a few scales on proximal part. Ant. IV is elongated, distinctly annulated upon whole length, densely covered with verticillating, short setae and ending in an obscure apical bulb. This last segment seems to be easily mutilated and only 6 examples among 86 have this segment and the length is often unequal in the same individual or on the way of regeneration. The ratio above is measured by an example with longest antennae. Labral setae 4/5, 5, 4, prelabral setae simple, distal smooth area is not intruded. Distal margin with 2+2 spinules, the lateral pair is situated upon small papillae Tenent hairs feeble, lightly broad distally. Unguis with a pair of inner proximal teeth near the basis and an unpaired distal tooth. A dorsal and a pair of lateral teeth subequal and situated on the same niveau of the unguis. Trochanteral organ well developed and marginal setae are longer than the central ones. Ventral tube not scaled, hirsute on both sides as figured and some setae, especially the basal lateral pair, are almost smooth and spiny. Tenaculum with quadridentate rami and its corpus with a median seta. Furca well developed, ratio as 3 : 4. Manubrium is dorsally beset with many plumose setae. Ventrally it is densely scaled and without setae except for one small median pair directly behind the end. Dentes dorsally crenulated and with one blunt, ciliated seta near the basis. Laterally the dens is hirsute with long, filiform setae mixed with hyaline, elongate scales. No dental spines. Mucro is bidentate equally and with or without (vide infra) a basal spine. Smooth portion of dentes ca. 3.5 times the mucro in length. Head and all body segments are densely covered with brownish scales, whose distal margin is finely serrated. Chaetal arrangement of larger body setae is rather simple and as in fig. C, which is almost constant in all cases examined. Abdominal end shows sexual dimorphism. In female examples upper flap of the anus of abd. VI is considerably projecting and with two eversible sacs on each side (fig. K), while abd. VI is quite indistinct and without eversible sac in all male examples so long as I have examined.

The above description is based on examples with more than 2.5 mm of body length. In smaller individuals (shorter than 2.0) the projection of dorsal anal lobe of the female is not to be observed, abd. V and VI distinctly separated and without sacs at the place. Mucro is also without basal spine. In examples with

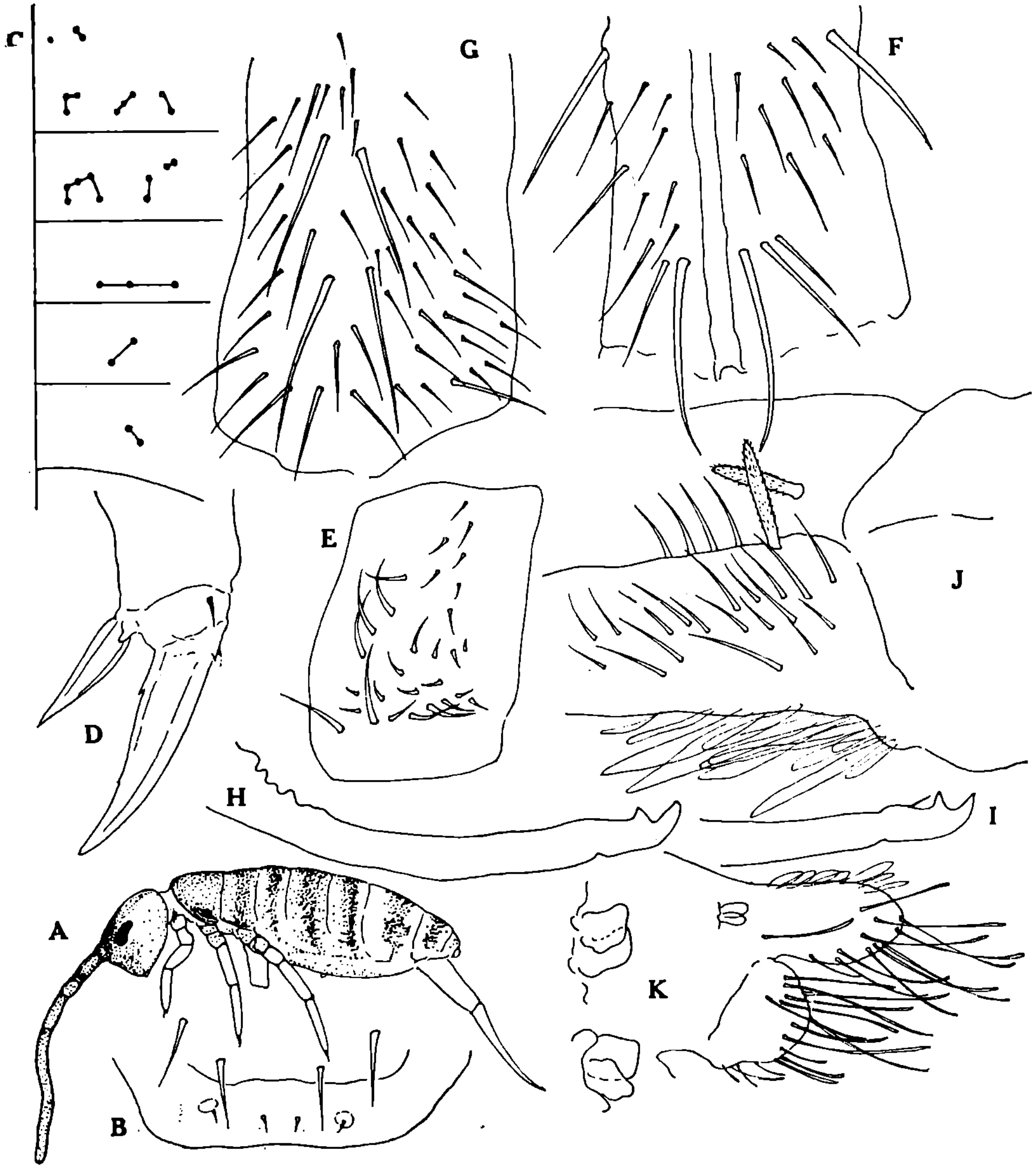

Fig. 25 *Dicranocentrus indicus* BONET
A : Habitus, B : Labral margin, C : Chaetal arrangement of body, D : Fore-claw, E : Trochanteral organ, F : Ventral tube (anterior face), G : Ditto (Posterior face), H, I : Two types of mucro, J : Dental basis in dorso-lateral view, K : Vesicles and abd. V, VI.

2.0-2.5 mm. both types are present. The diagnosis of the species given by BONET (1930, p. 255) coincides to the examples of small body size. Formosan examples surprisingly coincide well to Indian forms in all details, including the chaetal arrengement. The species has been also found from the Tonga Islands in South Pacific. As the species is so widely distributed, its identity with African forms : *D. assimilis, inermis* SCHÖTT, 1926 (Cameroon) must be supposed.

Distribution : India, Formosa, South Pacific Island.

25. **Salina bicinctoides** sp. n. Fig. 26

1 expl Kanheri near Bombay, 2. X 1960

Body length 1.5 mm. Ground colour white. Antennae lightly pigmented upon distal end in proximal three segments. Head pigmented between two eyes.

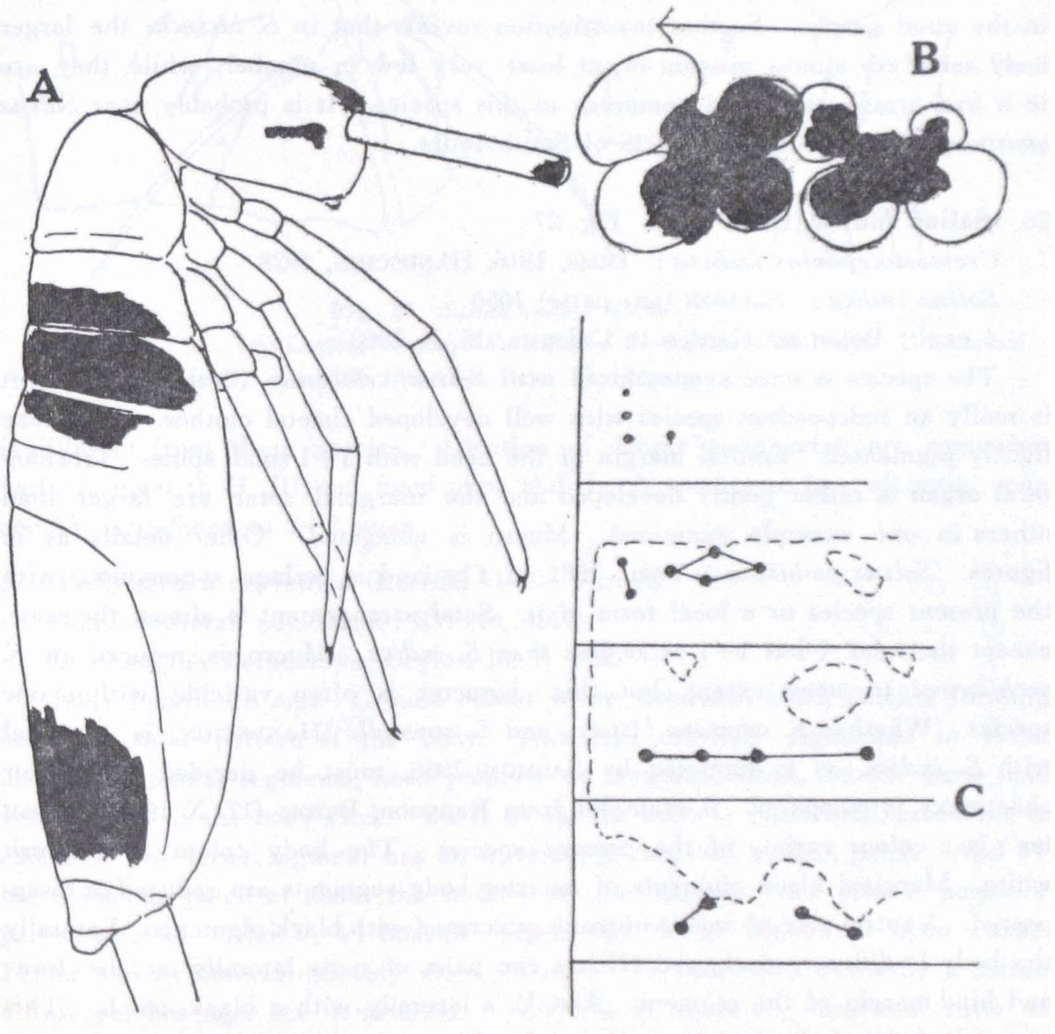

Fig. 26 *Salina bicinctoides* sp. n.
A : Habitus, B : Eyes, C : Chaetal arrangement of body.

A broad stripe upon th. III (posterior half), abd. I and II (anterior half). This transverse stripe is separated dorsally by narrow median pale line. Posterior half of abd. IV also broadly pigmented. All these body pattern is bluish violet and, when magnified, composed of an assembly of small mosaic of pigments. Ant./head as 5 : 1. Ant. ratio as 14 : 20 : 18 : 25. Eyes 8+8. Each cornea is poorly pigmented and isolated to each other. Furthermore G and H are smaller than others. Abd. III/IV as 1 : 8. Legs and unguicular appendages as usual of the genus. Trochanteral organ of ca. 20 short setae in a quadrangle. Furca well developed, mucro tridentate and with a dental appendix in usual way. Chaetal arrangement is not sure on th. II, but that of other segments is symmetrically as figured.

The body pattern of this species is almost the same with Japanese *Salina bicincta* (BÖRNER, 1909), except that the cephalic capsule is deeply coloured in the cited species. Further investigation reveals that in *S. bicincta* the larger body setae are almost missing or, at least, very few in number, while they are in a fixd arrangement and numerous in this species. It is probably near *Salina quattuorfasciata* HANDSCHIN, 1928 of South India.

26. **Salina indica** (IMMS, 1916) Fig. 27

Cremastocephalus indicus : IMMS, 1916, HANDSCHIN, 1928

Salina indica : SALMON (pro parte) 1956

4 expl. Botanical Garden in Calcutta, 15. X 1960

The species is once synonymized with *Salina celebensis* (SCHÄFFER), but it is really an independent species with well developed chaetal clothes. Antennae lightly pigmented. Frontal margin of the head with 1+1 small spines. Trochanteral organ is rather poorly developed and the marginal setae are larger than others in one example examined. Mucro is elongated. Other details as in figures. *Salina yoshikawai* YOSII, 1961 of Thailand is perhaps synonymous with the present species or a local form of it. Setal arrangement is almost the same, except that abd. I has 1+1 setae less than *S. indica*. Mucro is reduced in *S. yoshikawai* to some extent, but this character is often variable within one species. Whether *S. montana* (IMMS), and *S. striatella* (HANDSCHIN) is identical with *S. indica*, as is supposed by SALMON 1956, must be decided after their chaetotaxy is compared. 6 examples from Rangoon, Burma (17. X 1960 R. YOSII leg.) is a colour variety of the present species. The body colour is greenish white. Marginal black pigments of anterior body segments are reduced or disappeared. Ventral side of head and trunk punctured with black pigments. Laterally the body is diffusely dark, abd. III has two pairs of spots laterally at the fore- and hind-margin of the segment. Abd. V is laterally with a black patch. This is a pale form of the Indian species. At first sight it is almost equal to *S. celebensis* (SCHÄFFER) or *Salina affinis* (FOLSOM), but the chaetal arrangement

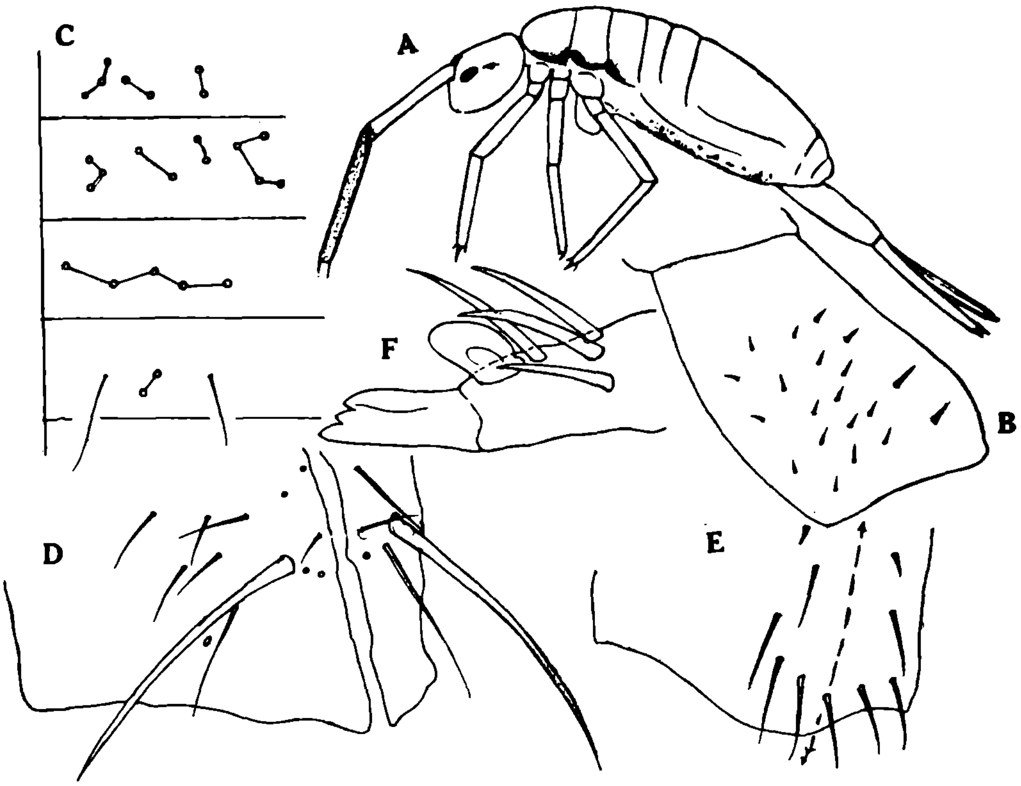

Fig. 27 *Salina indica* (IMMS)
A : Habitus, B : Trochanteral organ, C : Chaetal arrangement of body, D : Ventral tube (anterior face), E : Ditto (posterior face), F : Mucro.

is different from these species. Location of larger body setae are somewhat variable upon th. II, III, but fixed upon abd. I. A transverse row of setae upon abd. IV is reduced to 2+2 setae.

27. **Callyntrura ceylonica** (RITTER, 1910) Fig. 28
Campylothorax ceylonicus: RITTER, 1910
21 examples Peradeniya, Ceylon 10. X 1960

Body length 1.8 mm. Ground colour white, brownish black patches forming beautiful colour pattern of the body. Antennae diffusely pigmented in violet upon all antennal segments, head patched on antennal basis, mouth parts and ventral side of the body dark. Th. II to abd. II laterally pigmented, extending to abd. III. The latter segment has an intensively coloured median patch. Abd. IV has a median patch at about the middle of the segment and also a posterior paired patches. Abd. V, VI laterally pigmented. Legs pigmented upon coxae. Femur and tibiotarsus diffusely violet coloured. Furcula pale. Ventrally a paired diffuse patches near the tenaculum. Ant. I/head as 10 : 8. Antennal ratio as 20 : 24 : 17 : 52. Ant. I dorsally with narrow scales, others not scaled. Head with 8+8 eyes in two longitudinal rows. Frontal setae 4+4, somewhat ciliated. Unguis with prominent lateral teeth in a pair and two small inner teeth. Unguiculus acute and truncate on inner side. Tenent hair conspicuous, distally enflated. Trochanteral organ composed of ca. 20 rather long and large, simple setae in a triangular area. Ventral tube anteriorly with a row of ca. 3+3 larger setae. Posterior face hirsute with numberous ciliated setae stretching to the lateral portion of the tube. Rami tenaculi quadridentate, corpus with one large seta. Furcula well developed. man. : d. as 9 : 15. Manubrium hirsute both dorsally and ventrally. Dentes ventrally with many elongated scales, dorsally hirsute and without spinose setae. Near the mucronal end there is always dorsally a minute, rounded appendix, which represents the vestige of the dental scales of "*Handschinphysa*". Mucro typically built for the genus, having 6 teeth in usual manner. Larger body setae are strongly brownish and equally dichotomous on apex, in contrast to such setae of the cervical margin of th. II and those of abd. IV, where they are not forked apically, but simply blunt on apex. Chaetal arrangement is as in fig. F, corresponding fairly well with that of *C. microphysarum* YOSII, of Formosa, with which the species falls in the near relationship. Setae upon abd. II are different in two species compared.

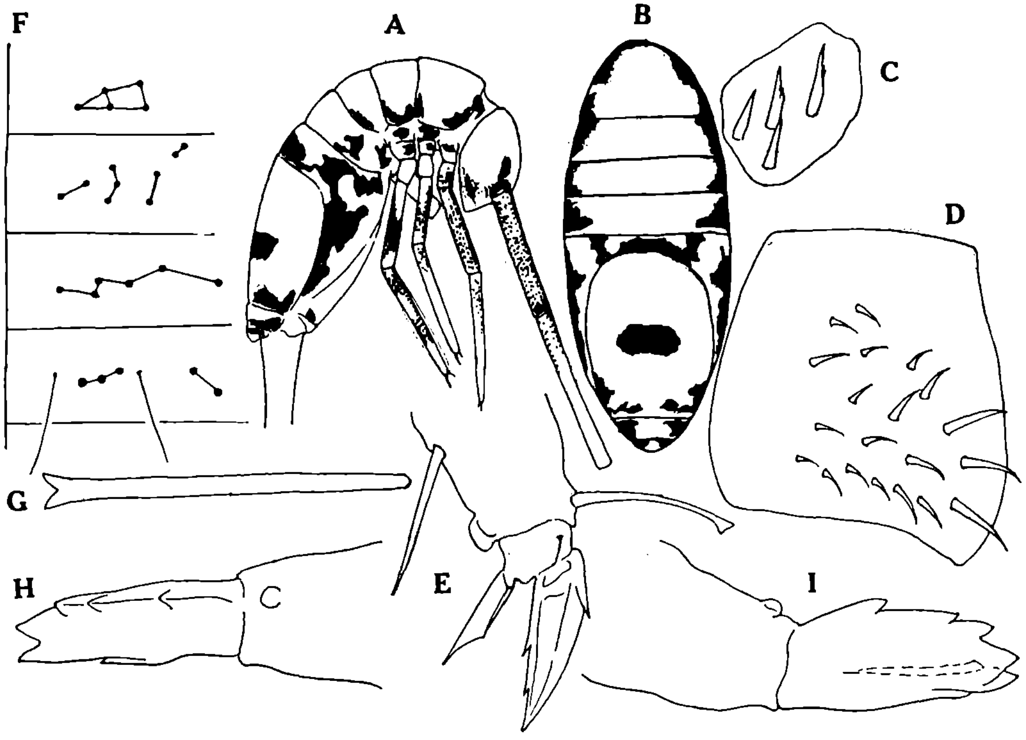

Fig. 28 *Callyntrura ceylonica* (RITTER)
A : Habitus, B : Dorsal aspect of body, C : Spiny setae of antennal basis, D : Trochanteral organ, E : Hind claw, F : Chaetal arrangement of body, G : Large setae of th. II, H : Mucro (dorsal view), I : Mucro (inner view).

The species is near *C. annulicornis* (OUDEMANAS, 1891) of Java in the body pattern. But as our knowledge about the species is very scanty, the form is identified with RITTER's species, which is described from Paradeniya.

28. **Callyntrura cingulata** (**BONET**, 1930) Fig. 29

Microphysa cingulata : BONET 1930, YOSII 1961

32 expl. Lonavla near Bombay, 4. X 1960, 13 expl. Kanheri near Bombay, 2. X 1960, 3 expl. Nasic near Bombay, 30. IX 1960

The examples coincide well with the BONET's description. Colouration is somewhat variable and BONET's examples represent rather intensely pigmented ones, which are rare in my collection. Usually body pigments are more diffuse upon posterior abdominal segments and may be absent totally in paler forms. Antennae are pigmented on outer side of ant. I, distally upon ant. II, III. Femur of all legs with an apical patch. Body scales are often intensively brown. Body length up to 2.3 mm. Ant. ratio as 25 : 30 : 22 : 53. Ant. I/head as 5/6. Ant. I and II (proximal) dorsally with long scales. Ant. IV slightly annulated. Head with 4+4 small spines near the frontal margin. Eyes 8+8, black. Labrum with setae 4/5, 5, 4, prelabral setae feathered. Median intrusion of smooth area broadly rounded. Distal margin with 6 minute tubercles. Unguis slender, with a pair of large lateral and two inner teeth. Unguiculus long, lanceolate and with an inner tooth near apex. Tenent hair long, subequal to unguis in length and apically enflated. Trochanteral organ is composed of ca. 30-50 spiny, smooth setae in a

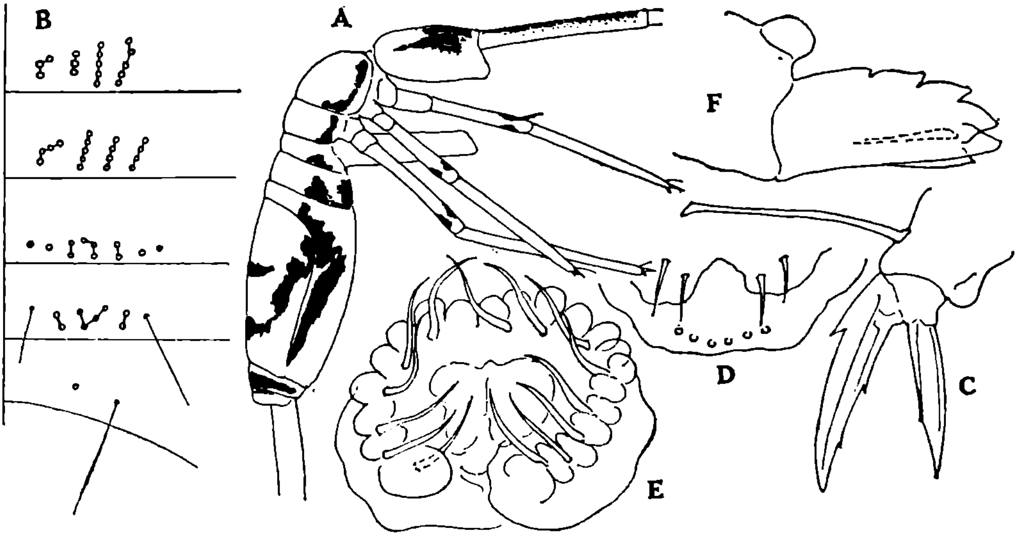

Fig. 29 *Callyntrura cingulata* (BONET)
A : Habitus, B : Chaetal arrangement of body, C : Mid-claw, D : Labral margin, E : Male genital ring, F : Mucro in outer view.

quadrangular area. Ventral tube very long, surpassing the femur in length. Anterior face has many long ciliated setae and distal ones are very large. Both posterior face and lateral flap bearing numerous ciliated setae. Furca in ratio as 2 : 3. Manubrium and dentes dorsally hirsute with ciliated setae and ventrally beset with scales. No special setae as in BONET's fig. A upon manubrium is to be found. No dental spines. Distal dental appendix conspicuous. Mucro rather short and broad, with typical arrangement of teeth. Male genital orifice is surrounded with many rounded tubercles and with a row of some 15 smooth, slender, hyaline setae. Chaetotaxy of body segments conspicuous in having many longitudinal rows upon th. II and III, by which the species is easily to be determined.

The species is somewhat near *C. bimaculata* YOSII, 1959 (Malaya) in body pattern, but different distinctly in the form of mucro and in the arrangement of body setae.

29. **Microparonella ceylonica** sp. n. Fig. 30

4 expl. Peradeniya, Ceylon 10. X 1960, 3 expl. Nasic near Bombay, 30. IX 1960

Body length up to 1.0 mm. Ground colour white, purplish black pigments are upon abd. II, III and distal half of abd. IV forming transverse patches. An-

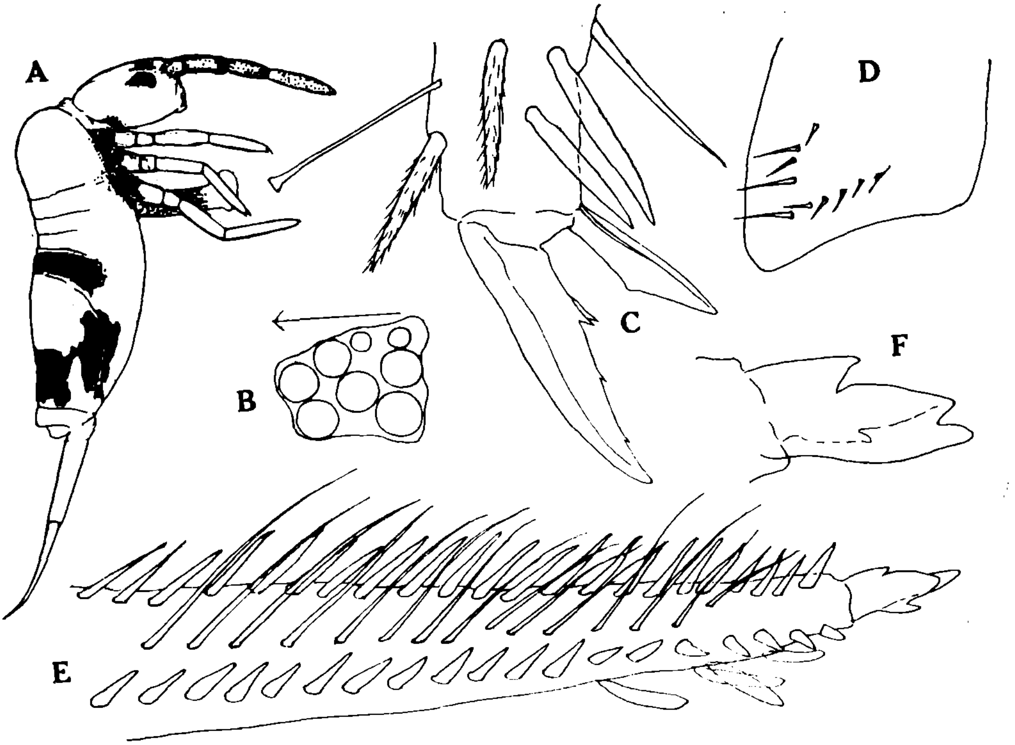

Fig. 30 *Microparonella ceylonica* sp. n.
A : Habitus, B : Eyes, C : Hind claw, D : Trochanteral organ, E : Dentes and mucro in dorsal view, F : Mucro (outer lateral view).

tennae, each coxae and ventral tube bluish pigmented. General shape of the body as in *Lepidocyrtus*. Antennae short, being 1.4 times the head in length. Ant. ratio as 3 : 5 : 5 : 8. All segments unscaled. Ant. III and IV with some slender, spiny setae, beside usual ciliated ones. Ant. IV not subdivided, not annulated and without terminal bulb. Eyes 8+8, two pairs of which are considerably smaller than others. Frontal margin of the head capsule with some ciliated setae, posterior margin of it without any setae. Legs unscaled, unguis straight, with a pair of inner basal teeth moderately developed, accompanied by 2 minute distal teeth. Tenent hair blunt on apex. Trochanteral organ composed of ca. 12 small setae arranged in L-shape. Ventral tube relatively long, anteriorly with 7+7 ciliated, slender setae. Posterior face has many ciliated setae and 1+1 terminal setae are spiny. Furcula in man. : d. as 10 : 11. Manubrium dorsally with many feeble setae and ventrally with hyaline scales. Dentes converging distally, with three rows of dorsal setae, inner row is converted to ca. 30 short, but strong spines, outer row is also somewhat spiny, but not so typically. An another row is composed of many long, ciliated setae. Ventral side is densely scaled. Mucro short, apical and anteapical tooth subequal, the third and the fourth tooth is situated each upon the inner and outer ridge of two dorsal ridges, which connect the anteapical to the mucronal basis. In lateral view the inner tooth (the fourth) is lower in position than the outer (the third) tooth. Body uniformly covered with small hyaline scales and achaetotic typically.

The genus *Microparonella* CARPENTER, 1916 is established by *M. caerulea* CARPENTER, 1916 of Seychelles to which the new species is nearly related. This species has, however, 6 mucronal teeth. *Lepidonella* YOSII, 1960 of Solomones may be included in this genus. *Paronella carpenteri* DENIS, 1931 (Costa Rica), *P. separata* DENIS, 1933 (Costa Rica) and *P. subcarpenteri* DENIS, 1941 (Vietnam) may be also *Microparonella*.

30. **Dicranocentroides fasciculatus** IMMS, 1912 Fig. 31

IMMS, 1912, SALMON, 1958

3 expl. Botanical Garden, Calcutta, 15. X 1960, 1 expl. Khandala near Bombay, 4. X 1960

Body length 3.0 mm. Colouration uniformly brownish yellow. Antennae distally dark. A bluish spot medially between antennal bases and on abd. VI. Slight bluish tinge is laterally upon head and trunk. As these pattern is different from the description IMMS' and SALMON's, a new form *flavescens* f. n. is proposed. Ant./head as 10 : 3. Ant. ratio as 18 : 20 : 17 : 23, ant. III being smaller than ant. II. First two segments are broad, but not so strongly as in *D. coomani* D. D. and with many large, strongly feathered setae, which are, however, not so plumose as in IMMS' figure. Last two antennal segments are densely beset with short and ciliated setae. Mingled with these setae, ant. IV bears some simple setae, which are setaceous, outstanding and apically knobbed. Such setae are restricted to the distal end in other antennal segments. Ant. IV is ending apically with a spinous seta. Antennae and legs are not at all scaled. Fore margin of head without spines. Eyes 8+8, black and their arrangement is *Paronella*-type. A row of patellate-setae between eye-fields. Unguis alike to *Entomobrya* and a pair of lateral teeth are prominent. Unguiculus is short upon fore-legs, almost truncate on inner side. It is longer upon other legs, but always pointed. No outer tooth is observed (cf. HANDSCHIN, 1926 for *D. longiceps*). Tenent hair thin and apically flattened. Trochanteral organ with 25–30 short spines, some 5 setae of the posterior border are longer than others. Ventral tube is not scaled, hirsute with many ciliated setae and a distal row of the anterior face is larger than others. Furcula well developed. Manubrium ventrally with many ciliated setae, dorsally with larger ciliated setae and laterally with many such setae and some short, narrow scales. Dens not much tapering distally, dorsally with many

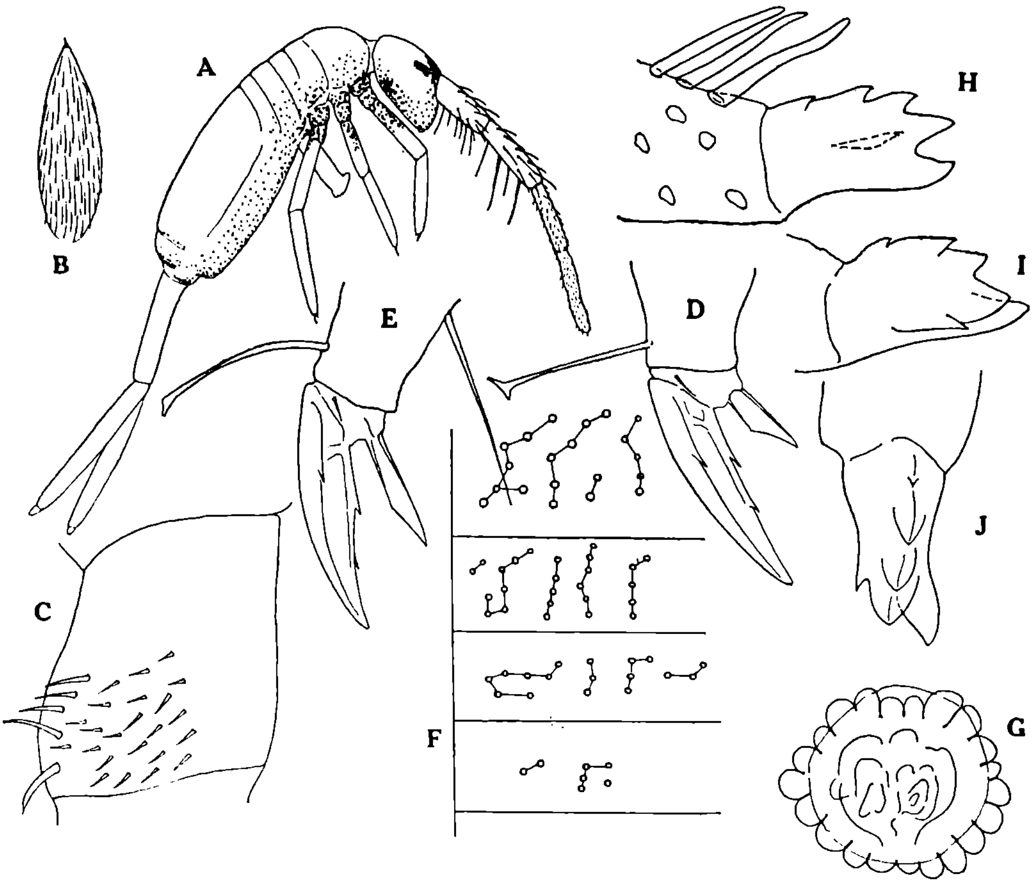

Fig. 31 *Dicranocentroides fasciculatus* IMMS
A : Habitus, B : Scales from abd. III, C : Trochanteral organ, D : Fore-claw, E : Hind-claw, F : Chaetal arrangement of body, G : Male genital field, H, I, J : Mucro in outer, inner and dorsal view.

ciliated setae, ventrally and on outer side with shorter ciliated setae. Inner side of the dentes bears very long ciliated setae together with some 30 pairs of blunt spines in an irregular interval and arrangement on the proximal 2/3 of the length. Mucro is not different from *Callyntrura* (YOSII 1959 p. 46) in principle, but outer tooth is very large, while d_1 is almost vestigial. In general, it is shorter than in the cited genus. Genital field of a male is papillate, but without any setae surrounding the anal cone (juvenile ?). Chaetotaxy of the body is highly complicated as in fig. F. Abd. IV with a transverse row of larger setae at about the middle of the segment. Scales and setae are all strongly brownish and well chitinised. The formers are uniformly lanceolate or fusiform and pointed at the base and on apex. They are striated rather heavily. Head capsule is scaled on the posterior half, while all segments of the body are densely scaled.

The examples at hand are possibly a depicted form of *D. fasciculatus* IMMS, although they are different from the description in having one extra mucronal tooth (d_1). Such variation is already reported in SALMON, 1957. An another example of *Dicranocentroides* has been collected from Lonavla near Bombay (4. X 1960 R. YOSII), by which the body is almost pale and ant. II is intensely violet black. In many body details it is the same with *D. fasciculatus*, differing in the chaetotaxy of the trunk. Probably it represents an independent species and the specific difference in this genus appears in the chaetal arrangement of abd. II.

31. **Cyphoderus javanus BÖRNER,** 1906 Fig. 32

Syn. nov. *C. assimilis* (nec BÖRNER) : UCHIDA 1943, YOSII 1953
C. sp. : YOSII 1955.

10 expl. Botanical Graden in Calcutta, 15. X 1960, 4 expl. Phet Buri, Thailand 20. X 1960, 2 expl. Uh-Lai, Formosa 24. X 1960, 3 expl. Ginowan, Okinawa 3. VII 1959, M. NISHIHIRA leg. 6 expl. Nakanosima, Tokara, Japan 15. XI 1953, S. UÉNO leg. 1 expl. Himeji, Japan, Y. MORIMOTO leg.

Body length ca. 1.7 mm. Totally white. Ant./head as 12 : 7. Ant. ratio as 2 : 7 : 4 : 10. Ant. IV without end-bulb, but richly beset with slender, curving sensory setae beside usual ciliated ones. Such sensory setae are present also upon ant. III and II (distal). Labrum with setae arranged as 4/5, 5, 4, prelabral setae smooth. The first row of labral setae slender, the inner pair of the second row is stout and thick compared to others. A thick ledge of inverted U-form is the margin of distal smooth area to form a median intrusion. Distal labral margin without any structures. Mesonotum moderately developed. Tenent hair of all legs slightly dilated on apex. Unguis stout, with a pair of inner proximal and one distal teeth. The former is not equally developed, posterior one is obscure and converted to a ridge-like thickening, while the anterior one is strongly developed, almost cuspidate in form. In fore- and mid-legs it is a little shorter than and on hind-legs subequal to unguiculus in length. An unpaired inner distal tooth distinctly present. Unguiculus is lanceolate and with a braod outer tooth. Trochanteral organ is composed of about 16 short setae in L-arrangement. Ventral tube elongate, curving forewards distally. Anterior face with 2+2 slender, ciliated setae. Posterior face has 7 (2+2, 1, 1+1) setae in a fixed pattern and lateral flap has 2 setae each. Rami tenaculi quadridentate, corpus with one seta. Furca in ratio as 8 : 5 : 2. Manubrium is ventrally scaled and without setae, dorsal side with many ciliated setae. Dentes not converging distally, with 6 outer and 5 inner scales. Basally one smooth and two ciliated setae in a transverse row, then a dorsal row of 4 smooth setae, '3 of which are attached to the proximal three scales of the outer row. Mucro subequal to the distal outer scale in length, bidentate apically and with a slight lateral ledge. Integument is smooth, body setae achaetotic and no large setae are existing. s. s. filiform, 2, 3, 2 upon abd. II-IV and their accessory setae are ciliated.

The present materials are concordant with the short but precise description of BÖRNER in all details. Dental chaetotaxy is not given in his diagnosis, but probably as above. Excepting the presence of one inner distal tooth of the unguis, *C. javanus* is not to be separated from *C. albinus*. *C. assimilis* BÖRNER

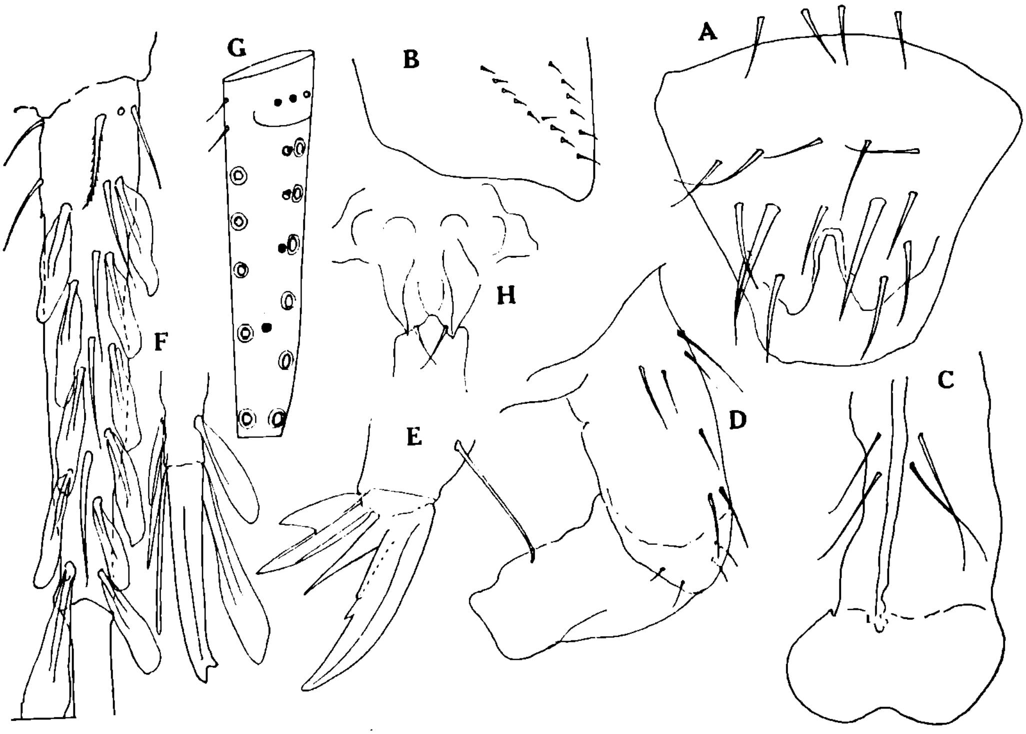

Fig. 32 *Cyphoderus javanus* BÖRNER
A : Labrum, B : Trochanteral organ, C : Ventral tube in anterior face, D : Ditto in posterior face, E : Mid claw, F : Dentes and mucro in dorsal view, G : Ditto in diagram, H : Manubrial thickening.

from Egypt is perhaps a local form of the present one and almost all Oriental forms hitherto reported as *C. assimilis* must be regarded as *C. javanus.* The name has page-priority over *C. assimilis. C. simulans* IMMS 1912 (Lower Burma) is a problematic species, it has 2 inner teeth of unguis and dental plumose scales are outer-6, inner-6.

Distribution : India, Java, Malay, Thailand, Formosa, Japan.

Rem. : Identity with the neotropical *C. similis* FOLSOM, 1927 must be discussed.

32. **Cyphoderus albinus** (NICOLET, 1841) Fig. 33

Syn. nov. ? *Cyphoderus rubiae* : BAIJAL, 1955

5 expl. Bombay, 5. X 1960, 6 expl. Khandela, near Bombay, 4. X 1960, 14 expl. Nasic near Bombay, 30. IX 1960, 3 expl. Lonavla near Bombay, 4. X 1960, 21 expl. Malabar Hill in Bombay, 1. X 1960

Indian examples coincide well with the description of this European species by various authors. Some additional notes are given below : Labrum quite equal to *C. javanus* in all details. Unguis stout, with a inner proximal tooth well developed and almost spiny in outline. The anterior tooth of the pair is converted to ridge-like thickening and very obscure. No distal inner tooth present. Troch-

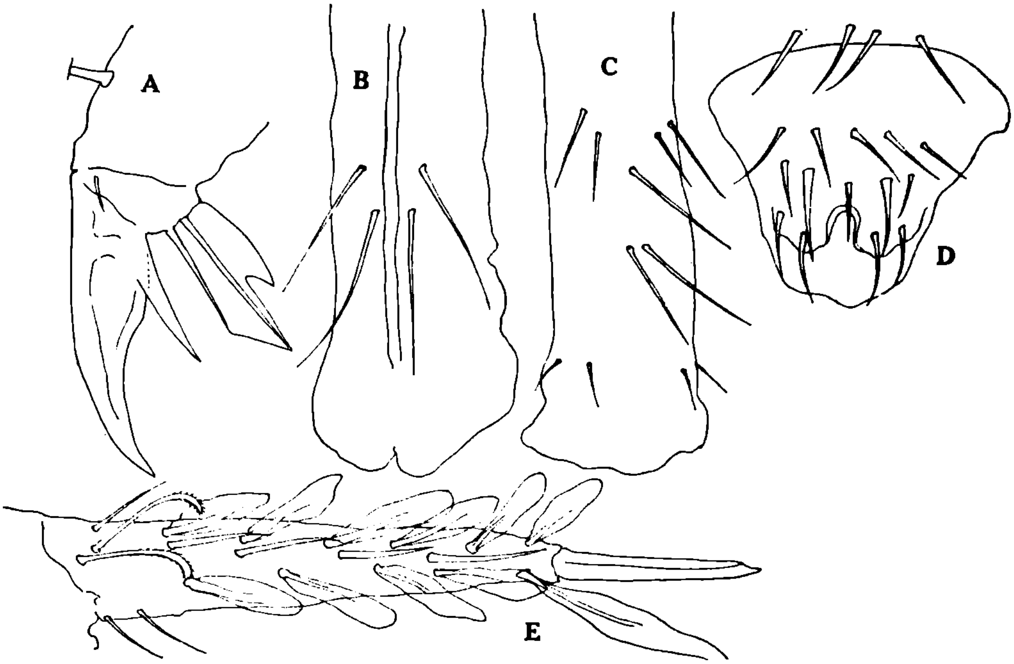

Fig. 33 *Cyphoderus albinus* (NICOLET)
A : Mid-claw, B : Ventral tube (anterior face), C : Ditto (posterior face), D : Labrum, E : Dentes and muco in dorsal view.

anteral organ composed of about 15 simple setae in L-shape. Rami tenaculi 4 dentate and with a median seta on corpus. Ventral tube distally directed forewards. Anterior face has 2+2 setae. Posterior face has 2+2, 1, 1+1=7 setae. Lateral flap with 2 setae each. This chaetal pattern is constant and common with *C. javanus*. Manubrium ventrally scaled and dorsally with many ciliated setae. Dental scaly setae as outer 6, inner 5. A row of 4 ciliated setae are constantly present dorsally and 3 of which are attached to 3 proximal scales of the outer row, a little dorsally to each, while one another is placed near the penultimate scale of the inner row. Near the manubrial end there are 1 spiny and 2 ciliated setae and, lastly, a simple seta at the basal part of the inner side. Manubrial articulation of dentes is well chitinized and ventrally with an acutely pointed process. Mucro is apically bidentate and with a slight lateral ridge. Mucro : distal inner scale as 1 : 1. Ant. ratio as 10 : 30 : 20 : 45. Abd. III : IV as 4 : 11. Furcal ratio as 14 : 9 : 4.

The species seems to be different from *C. javanus* only in the form of unguis. *C. rubiae* BAIJAL, 1955 (Himalaya) and *C. agnotus* BÖRNER, 1906 (Argentine) can not be divided specifically from *C. albinus*.

Distribution : Europe, India (nov.), Argentine (?), Micronesia (?).

33. **Pseudocyphoderus annandalei** IMMS, 1912 Fig. 34

IMMS, 1912, BÖRNER 1913.

36 expl. Lonavla near Bombay, 4. X 1960, from the ground nest of a termite.

Body length ca. 1.3 mm. Colour white. General shape of the body strongly depressed. Cockroach-like in appearance. Antennae inserted ventral to the head capsule. Antennal ratio as 4 : 7 : 7 : 8. Ant /head as 11 : 3. Ant. IV without terminal bulb, densely hirsute. Other antennal segments have some stronger setae, but without scales. Mouth hypognathous, mouth parts strongly reduced and the mandible is with faint sign of molar part. Labrum low, with setae arranged as 4/4, 5, 4. Prelabral setae thick and ciliated. The first row of labral setae 4 in number, small. Second and third row thick. No intruding of distal smooth area and no marginal structure. Tenent hair of each legs feeble, either simply setaceous or dubiously clubbed on apex. Unguis small and differs considerably from the description of previous authors. All examples examined has no tunica and without inner distal tooth. An outer basal tooth is wing-like and attached more basally than figured by IMMS. Inner basal tooth is not observed. Unguiculus large, with a broad outer tooth at about the middle. Trochanteral organ composed of ca. 10 spiny setae in L-shape. Ventral tube anteriorly with some 15 pairs of strong setae and posteriorly with only 1+1 small setae situated near the distal margin. Lateral flap has 5-6 ciliated setae. Rami tenaculi 4-toothed, corpus with a median anterior seta. Furca in ratio as 65 : 30 : 12. Manu-

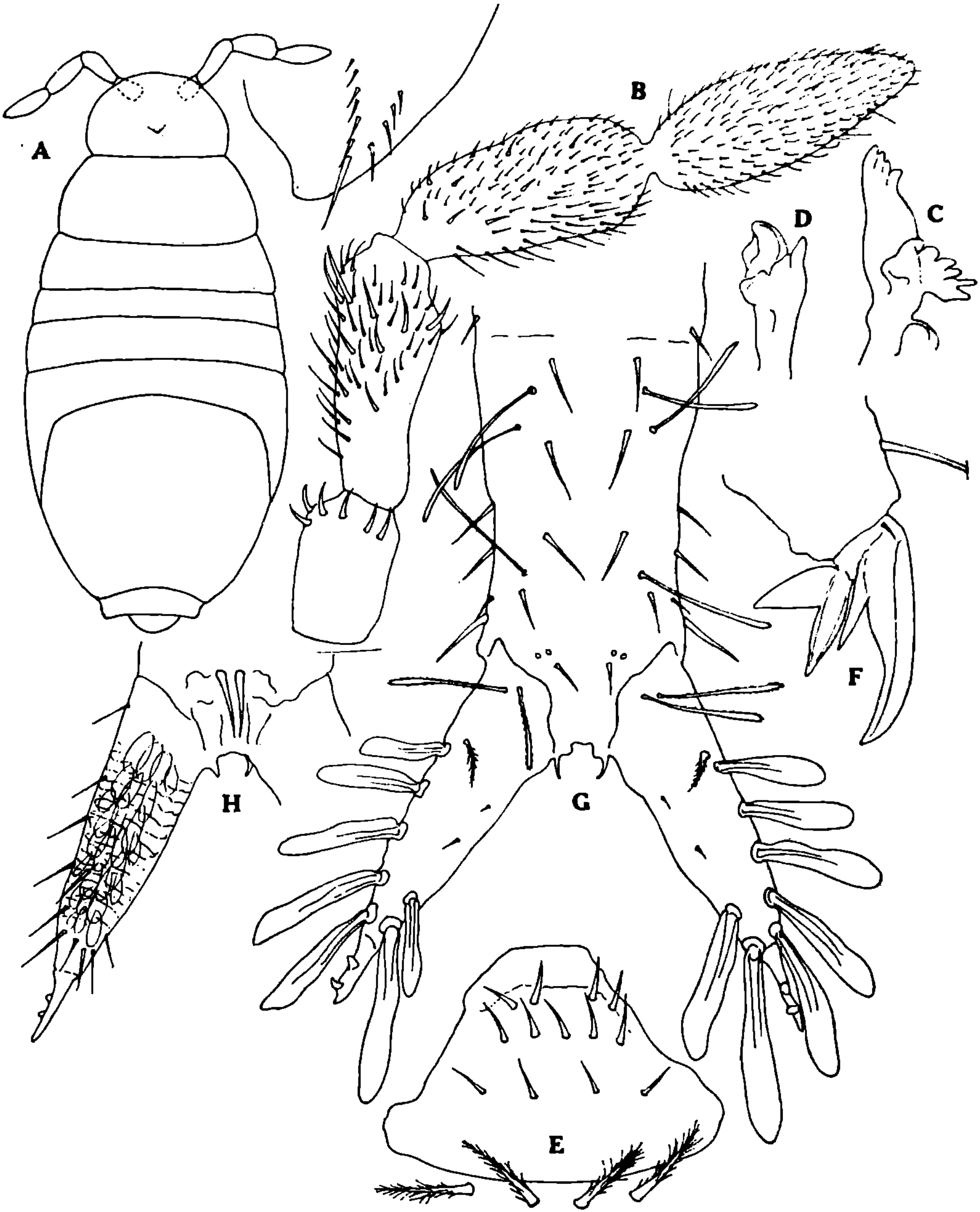

Fig. 34 *Pseudocyphoderus annandalei* IMMS
A : Dorsal view, B : Antenna, C : Mandible, D : Maxilla, E : Labrum, F : Mid-claw, G : Furca in dorsal view, H : Ditto in ventral view.

brium indistinctly subdivided into two parts subequal in length. Dorsally it is not scaled, but with long, ciliated and short, smooth setae in a symmetrical arrangement. The distal half of the setal arrangement as figured in G. Ventrally both parts of manubrium are densely scaled and no setae are to be seen except for 1+1 strong spiny ones lying directly behind the distal hook. Dentes converging. Winged scales arranged as outer 5, inner 2, the distal inner one the largest and the most proximal one of each row may or may not be smaller than others. Besides 2 small inner setae and 3 ciliated basal setae are constantly present. Ventrally it is scaled is 2-3 rows medially, with many integumentary transverse crenulations and with some short, spiny setae arranged almost constantly as in fig. H. Mucro is short, apically blunt and with two large intermittent teeth. Integument of all body segments equally scaled with small, rounded and hyaline scales. No large body setae are present.

In contrast to IMMS' and BÖRNER's description of the species the unguis is not tunicate, without distal inner tooth and the outer winged tooth is basally situated. The fact implies the wide intraspecific variability of the form of unguis within one species of *Cyphoderidae*. This termitophilous species is already found from Chilka Lake District (South India) and Khandala, a small village 3 km apart from Lonavla, where my specimens were collected.

34. **Cyphoderopsis ceylonica** sp. n. Fig. 35

1 expl. Peradeniya, Ceylon 10. X 1960

Body length 1.4 mm. White in ground colour, thoracal tergites are faintly yellowish in alcoholic examples. Ant./head as 5 : 3. Ant. ratio as 13 : 26 : 20 : 45. Ant. III is, therefore, shorter than ant. II. Dorsal side of ant. I and II (prox.) with some hyaline scales, others not scaled, but with ciliated setae. Ant. III and IV bearing many slender and short sensory setae, together with usual ciliated ones. Apical end-bulb is not observed. Fore margin of head with a row of ciliated setae. Posterior margin of the head capsule without a row of spiny setae. Eyes and eye pigments quite absent. No postantennal organ. Legs not scaled. Tenent hair distally pointed. Unguis acute, with well developed inner basal pair of teeth, the anterior one of which is strongly wing-like. An additional inner distal tooth is placed at about the middle of the unguis. Unguiculus lanceolate, acute apically and without tooth. Trochanteral organ is ca. 15, small setae arranged in L- shape. Ventral tube anteriorly with 3+3 slender setae. Posterior face is covered with many (ca. 15) long setae. Furcula elongate, man : d : mu as 75 : 50 : 14, so that d : mu as 3.6. Manubrium is dorsally with some setae, ventrally with many scales. No lateral setae are modified. Dentes ventrally scaled, dorsally with many slender setae and a row of strong spines (ca. 20) along the inner side. Mucro is elongate, large apical tooth is almost straight. An anteapical one smaller. Upon the outer ridge of two dorsal ridges running proximally from the an-

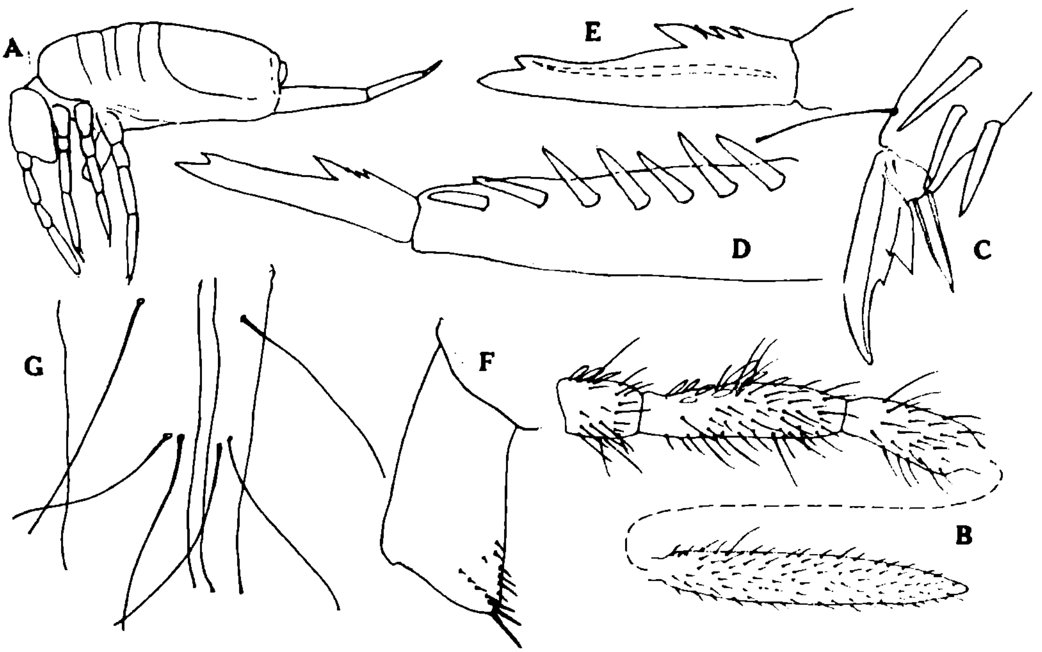

Fig. 35 *Cyphoderopsis ceylonica* sp. n.
A : Habitus, B : Antenna, C : Mid-claw, D : Dentes and mucro, E : Mucro,
F : Trochanteral organ, G : Ventral tube in anterior face.

teapical to the basis, there are one large and 3 small teeth near the basis. Body covered densely with hyaline scales. No larger setae are to be observed from the tunk. The species is, therefore, achaetotic, in contrast to *Troglopedetes cavernicola* DELAMARE, 1944, which is oligachaetotic in nature.

The species is near *T. cavernicola* DELAMARE 1944 and *T. vandeli* CASSAGNAU et DELAMARE, 1955 (Lebanon), but different by the ant. IV being not subdivided into two segments.

35. **Cyphoderopsis 6-ocellata** sp. n. Fig. 36

5 expl. Lonavla near Bombay, 4. X 1960, 1 expl. Khandala near Bombay, 4. X 1960, 2 expl. Nasic near Bombay, 30. X 1960, 1 expl. Kanheri near Bombay, 2. X 1960, 1 expl. Uh Lai, Formosa 24. X. 1960

Body length 1.0 mm. White. General shape *Cyphoderus*-like. Antennae 4 segmented, ratio as 35 : 65 : 40 : 95. Ant./head as 40 : 13. Ant. I and II (proximal) with some scales dorsally. All segments intensely hirsute with short, ciliated setae. Ant. IV is not subdivided and apically with an obscure end-bulb. No sensory setae are to be seen. Head with 3+3 eyes, each having cornea and pigmented black, with some scattered pigments around them. Labrum with setae 4/5, 5, 4. Prelabral setae ciliated (?). All labral setae subequal. No median intrusion, but with a narrow integumentary furrow. Labral margin without structures. Legs not scaled, each tibiotarsus without smooth setae and the trochanteral organ is composed of 7 setae in L-arrangement. Unguis with a pair of inner basal teeth well developed, the outer one is almost wing-like. An obscure inner tooth is to be seen in great magnification. Unguiculus acute, inner margin is truncate. Ventral tube anteriorly with 4+4=1+1, 1+1, 2+2 long setae. Posterior side with about 20 setae and the terminal 1+1 is more acute and spiny than others. Furca in ratio as 55 : 40 : 10. Manubrium dorsally hirsute, with ciliated setae and scaled both laterally and ventrally. Basal hook of dentes strong. Dentes are with thick, ciliated setae dorsally and a row of strong smooth spines is running along the inner side, from the basis until near the apex. Their number is ranging 13–15. Setae along the outer side is also modified, but not so spiny as the inner ones. No dental appendix distally. Ventral side is richly beset with elongate scales. Mucro long, with a blunt apical and a smaller anteapical tooth. Outer mucronal margin which is connecting the anteapical tooth to the basis has two acute teeth, the proximal one stronger than the other. Inner margin smooth. Abd. III : IV as 10 : 85. All body segements are scaled and achaetotic.

The species is very characteristic having 3+3 pigmented ocelli. *Cyphoderopsis* CARPENTER, 1917 differs from *Troglopedetina* DELAMARE, 1945 in that distal

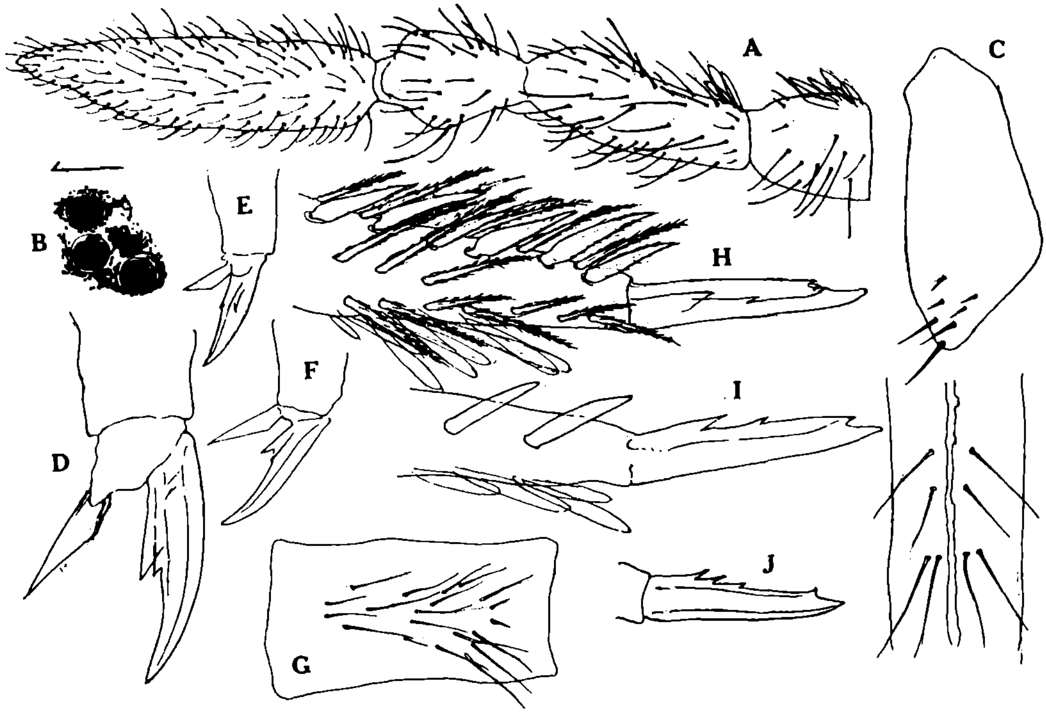

Fig. 36 *Cyphoderpsis 6-ocellata* sp. n.
A : Antenna, B : Eyes, C : Trochanteral organ, D : Hind-claw, E. F : Mid-claw, G : Ventral tube (posterior face), H, I, J : Dentes and mucro of various specimens. H is an example from Nasic, India, J is from Uh Lai, Formosa. Others are from Lonavla, India.

two segments are not going to ankylose. In a Formosan example mucro of one side has an extra dorsal tooth, but the other side is alike to Indian examples. All other characters are quite concordant.

Distribution : India, Formosa

36. **Oncopodura indica** sp. n. Fig. 37

6 expl. Malabar Hill, Bombay 4. X 1960

Body length ca. 0.6 mm. White. General shape alike to juvenile example

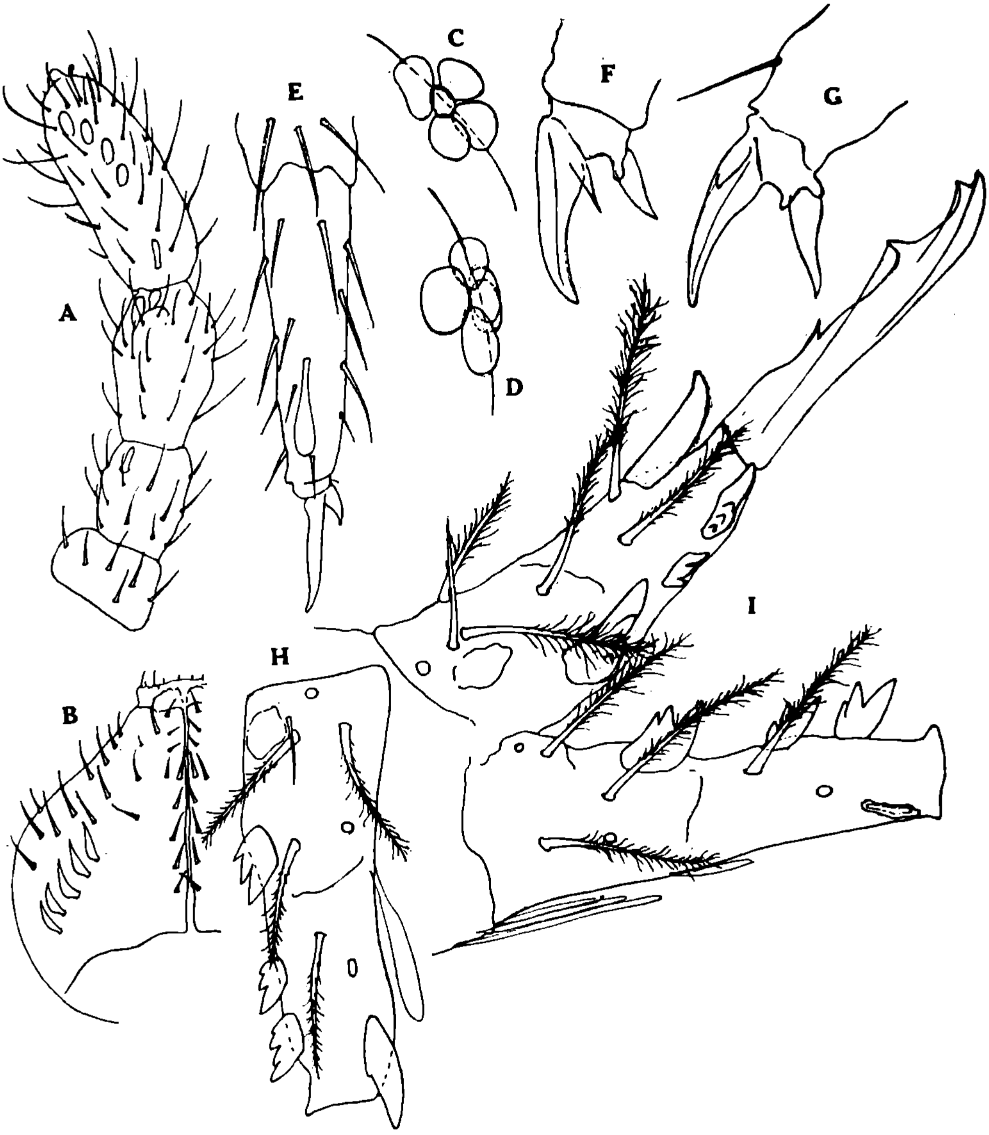

Fig. 37 *Oncopodura indica* sp. n.

A : Antenna, B : Ventral view of head capsule, C, D : Postantennal organ, E : Middle tibiotarsus with a vesicular appendix, F : Fore-claw, G : Hind-claw, H : Dentes in dorsal view, I : Dentes and mucro in dorso-lateral view.

of *Cyphoderus*. Ant./head as 1.0. Ant. ratio as 4 : 6 : 9 : 14. Ant. I and II have one, two sensory rods respectively near its distal margin. Whether they are corrugated or smooth is not certain. Ant. IV has dorsally a row of 4 blunt sensory rods and one basally situated smaller rod. Some slender setae are also present near them. Postantennal organ distinct, composed of 4 rounded tubercles situated cross-wise. Ventral side of the head capsule laterally with a row of 5 modified setae, alike to the candle-flame in shape. Legs not scaled. On fore- and mid-legs unguis is straight, with an inner posterior tooth strongly pointed and protruded to one side. Unguiculus broadly lanceolate, without tooth. Mid-tibiotarsus has dorsally a club-like seta as usual of the genus. Upon hind-legs not a trace of trochanteral organ present and unguis is stout, with a prominent dorso-lateral thickening near the basis. Tenent hair of all legs spiny. Ventral tube probably without setae. Rami tenaculi quadridentate. Furcula short, but well represented. man : d : mu as 10 : 5 : 4. Manubrium is ventrally only with scales and dorsally with 1+1 row of smooth, spiny setae 5+5 in number. Some 15 short, but strongly plumose setae are placed medially between rows of these spiny setae. Dentes converging distally. One prominent, but simple tooth is near the distal end of the outer side. Three teeth of inner row are all strongly dentated. 7 plumose setae and one spiny seta is located as in fig. H, I. Mucro is apically bidentate, the third tooth larger than these and the fourth one is cuspidate. The distal three are beset proximally with thin lamella.

With the exception of subgenus *Cyphoderellopsis* YOSII, by which the dental spines are minutely ciliated, all species of *Oncopodura* (s. str.) were known to us as true troglobionts until quite recently ARLÉ, 1960 has described two edaphic forms from the rain forest of Brazil. This new species, which is also edaphic in habitat, is characterized, above all, by the absence of foliaceous setae from the dorsal side of dentes.

37. **Megalothorax minimus WILLEM,** 1900 Fig. 38

BONET, 1947, STACH, 1957.

5 expl. Calcutta 16. X 1960, 2 expl. Bombay 4. X 1960, 15 expl. Rangoon, Burma 17. X 1960.

The species is already well described by previous authors. Following notes are to be added from Indian specimens : Body length 0.4 mm. Ant. III and IV confluent, with one thick sensilla distally and some extremely long sensory setae near the basis. Labrum is trapezoid in outline, distal part is prominently projecting and swollen in semiglobular form. Labral setae 4/5, 5, 4. Prelabrel setae and the first row of labral setae small and slender. Second and third row are thick, upon distal protuberance and with heavy sockets. Fore-legs have unguis rather slender, with a lateral tooth on one side and with acute unguiculus. Both of them without inner teeth. Mid-legs have shorter unguis, with a pair of lateral

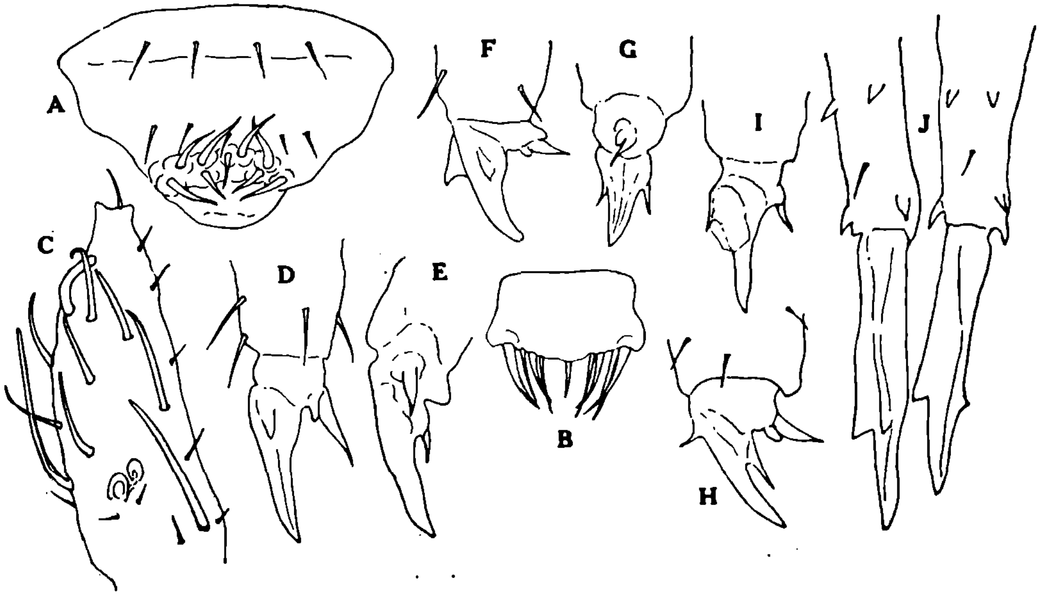

Fig. 38 *Megalothorax minimus* WILLEM
A : Labrum, B : Labral margin in inner view, C : Antennal end, D : Fore claw, E : Ditto in ventral view, F : Mid-claw, G : Ditto in ventral view, H : Hind-claw, I : Ditto in dorsal view, J : Mucro.

teeth and also without inner tooth. Hind legs have unguis dorsally slightly tunicate. End of dentes with spines and setae as already stated by STACH, 1957. Mucro is slender, without serration and both margin is, in dorsal view, with a pair of lateral teeth. This last structure is not to be seen in lateral view of mucro, but may be present in all examples of *minimus*. That the prelabral setae are 2+2 in number, in contrast to 3+3 of all *Sminthuridae* is to be regarded the characteristic of *Neelidae*. I have also witnessed the 2+2 setae in *Neelides* sp. of Japan. *M. laevis* DENIS, 1948 may be a synonym of this cosmopolitan species.

38. **Sphaeridia** cf. **pumilis** (**KRAUSBAUER,** 1902)

2 ♀, Botanical Garden in Calcutta, 15. X 1960, 2 ♀, Kanheri near Bombay, 2. X 1960, 2 ♀, Nasic near Bombay, 30. IX 1960.

39. **Sminthurides** (s. str.) **parvulus** (**KRAUSBAUER,** 1898)

1 ♀, Nasic near Bombay, 30. IX 1960

The example coincides fairly well with the description given by MURPHY, 1960 in the absence of mucronal seta, form of mucro etc.

Distribution : Cosmopolitan ?

40. **Collophora mysticiosa** sp. n. Fig. 39

1 ♀, Backyard of the "Tower of Silence" in Bombay, 30. IX 1960

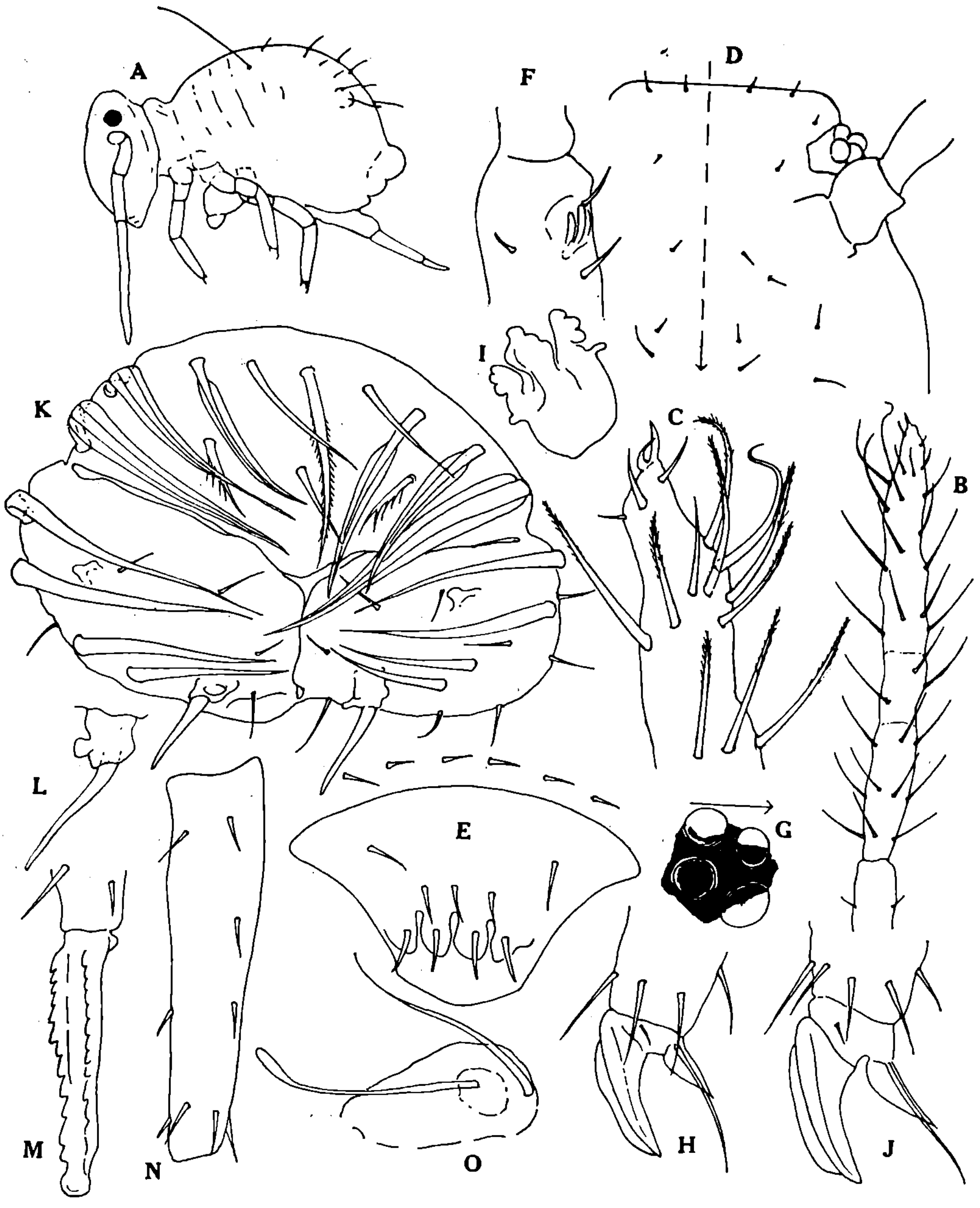

Fig. 39 *Collophora mysticiosa* sp. n.
A : Habitus, B : Ant. IV, C : Antennal end, D : Setae of vertex, E : Labrum, F : Ant. III-organ, G : Eyes, H : Mid claw, I : Tenaculum, J : Hidd claw, K : Anal field, L : Appandix analis, M : Mucro in dorsal view, N : Dentes in dorsal view, O : A vesicle on posterior dorsum of abdomen.

Body length 0.6 mm. Colouration grayish violet all over, dorsally somewhat mottled. Antennae deep violet, legs and furcula pale. Ant. : head as 3 : 2. Ant. ratio as 4 : 8 : 13 : 36. Ant. I-III with feeble setae. Ant. III-organ is two straight rods in a common deepening. Ant. IV is faintly annulated into 3, so that one intermittent subsegment is to be seen. Setae of this segment are strong, verticillating and slightly ciliated distally. Apical bulb absent, instead, an apical spine is to be seen. Some long, curving sensory setae are present and one seta among them is strong and apically curving in s- form. Eyes 4+4, well pigmented into black. Vertical setae and facial setae not modified. Labral setae remarkably as 6/2, 3, 4, such arrangement and number is very peculiar among *Sminthuridae*. Distal margin is perhaps without structures. Unguis of all legs dorsally carinate and with tunica. Lateral and inner tooth absent. Unguiculus triangular, acute, untoothed and with a long axial seta subequal to unguis in length. No tibiotarsal setae modified. Ventral tube conical, with 1+1 apical setae. Rami tenaculi tridentate and with a basal process, corpus without setae. Furcula in ratio as 7 : 20 : 8. Manubrium short, with 3+3 dorsal setae in a transverse row. Dentes tapering, with simple setae arranged as dorsal : 1 —— = 1, outer : 2 - 1, 1, 1 = 5, inner : 1, - 1 - 1 = 3, ventral : 3 —— 1 = 4. They are not spine-like and ventral ones are especially feeble. Mucro slender, apically broadly rounded, both margins serrated (ca. 14 teeth) and with a ventral basal preudonychium. Large abdomen with slight sign of segmentation by the mottlings of pigments. Anterior setae short, posterior ones larger, about 0.8 times the length of mucro in length and often apically blunt. Setae sensuales are anteriorly 3+3 and posteriorly 1+1, the latter pair is located upon large tubercle directly before the anogenital segment and a slender seta thereupon is distally ending in a lancet-like swelling. Anogenital segment is very peculiar. All dorsal setae of genital part are feeble, simple and small. Upon upper flap of anal valve all anal setae are very strongly developed. a_0 is slender and feathered. a′ present. $a_{2,3,4}$ are all very long and all of them are winged. a_3 is especially large and with broad lamellae. sa is setaceous, smooth, while sa′ are strongly barberated. Lateral anal flap bears a_{1-4} all strong, but not winged. $sa_{1,3}$ short sa_2 moderately long and all of them smooth. Near sa_1 there is a small, but prominent process. Appendix analis is a short, slightly blunt seta, shorter than a_4 and is located upon rather high papillae, which has 2-3 lateral swelling and, therefore, irregular in outline.

The present species is near *Arrhopalites qudrioculatus* DENIS, 1933 (Costa Rica) and *A. subquadrioculatus* DENIS, 1948 (Annam). From the former it is to be divided by the absence of inner tooth of unguis and from the latter by the presence of tunica of unguis. As female examples are not known of these cited species appendix analis and other female characters are not comparable. From *C. remanei* and *C. africana* DELAMARE et MASSOUD 1964, the species is to be distinguished by the ciliated a_0 of the upper anal flap.

41. **Sminthurus (Temeritas) womersleyi Denis,** 1948 Fig. 40

2 ♀, Malabar Hill in Bombay, 30. IX 1960, 1 ♀, Nasic near Bombay, 29. IX 1960.

The Bombay examples coincide very well with description of DENIS in body colour and other details. Following notes are to be added : Antennae exceptionally long and ant. IV is composed of 46 subsegments. Ant. ratio as 5 : 16 : 28 : 130. A pair of interorbital tubercles are prominently developed and one seta on it is very large and thick. The form is, however, more slender than DENIS' figure and there is an another thick seta dorsal to it. No postantennal seta is modified, but one long, slender seta at the position may indicate the nature of *S. viridis*-Group. Some of the facial setae are very long and their position is symmetrical with respect to the median line. Labral setae 6/5, 5, 4 and an outer pair of the first row is exceptionally slender and long, surpassing the labral margin, while the median 3 setae of the same row are almost vestigial. The second row of setae are small and no structure upon labral margin. Unguis with 1, 1, 1 inner tooth. Furcula in ratio as 5 : 10 : 3. Manubrium dorsally with 7+7 slender setae. Dental setae all smooth, arranged as dorsal : 1, 2, 1, 1, 1, 1 = 7, outer : 1, 1, 1, 1, 1, 1, 2 = 8, inner : 1, 1, 1, 1, 1, 1, 1 = 7, ventral : 3, 2, 2, 2, 2, 1, 1 = 13. Some additional small setae may be present near distal end. Mucro

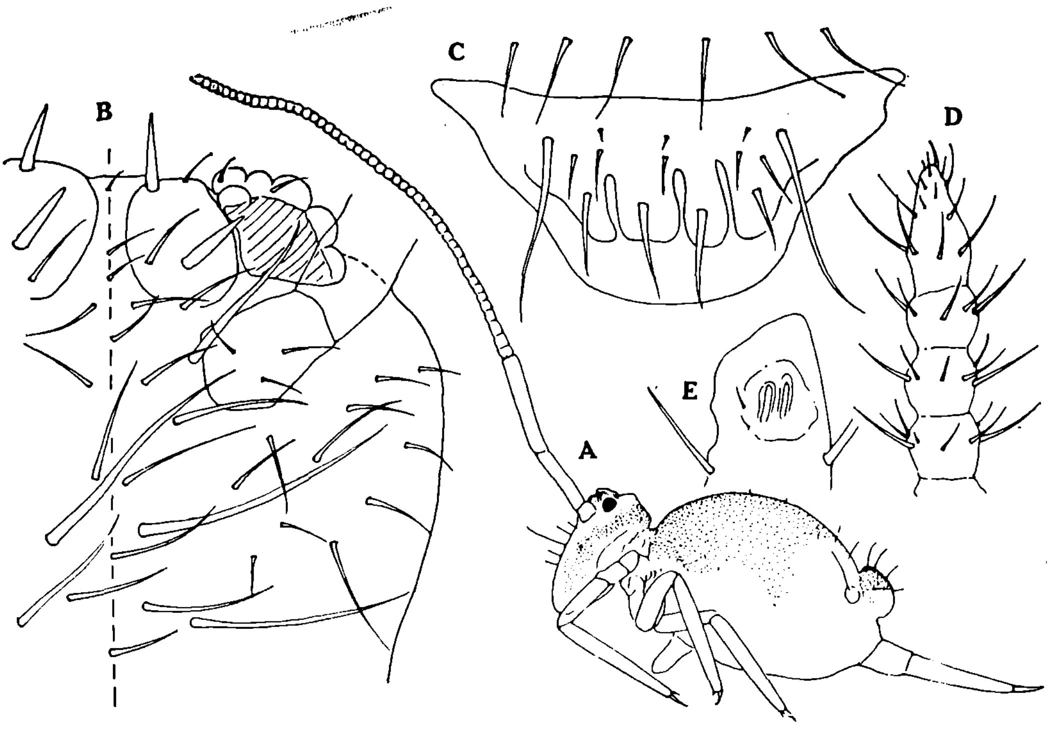

Fig. 40 *Sminthurus (Temeritas) womersleyi* DENIS
A : Habitus, B : Head, C : Labrum, D : Antennal end, E : Ant. III-organ.

ventrally carinate, with a basal pseudonychium. Outer side has a long mucronal seta. Both of dorsal margins are serrated (outer 16, inner 18), but distal part of outer lamella is almost smooth. No apical notch present.

Distribution : Vietnam, India (nov.).

42. **Sphyrotheca gangetica** sp. n. Fig. 41

1 ♀, Botanical Garden in Calcutta, 15. X 1960

Body length 1.5 mm. Ground colour white, deep purple pigments as in fig. A. Antennae pigmented distally from the middle of ant. III. Head with two

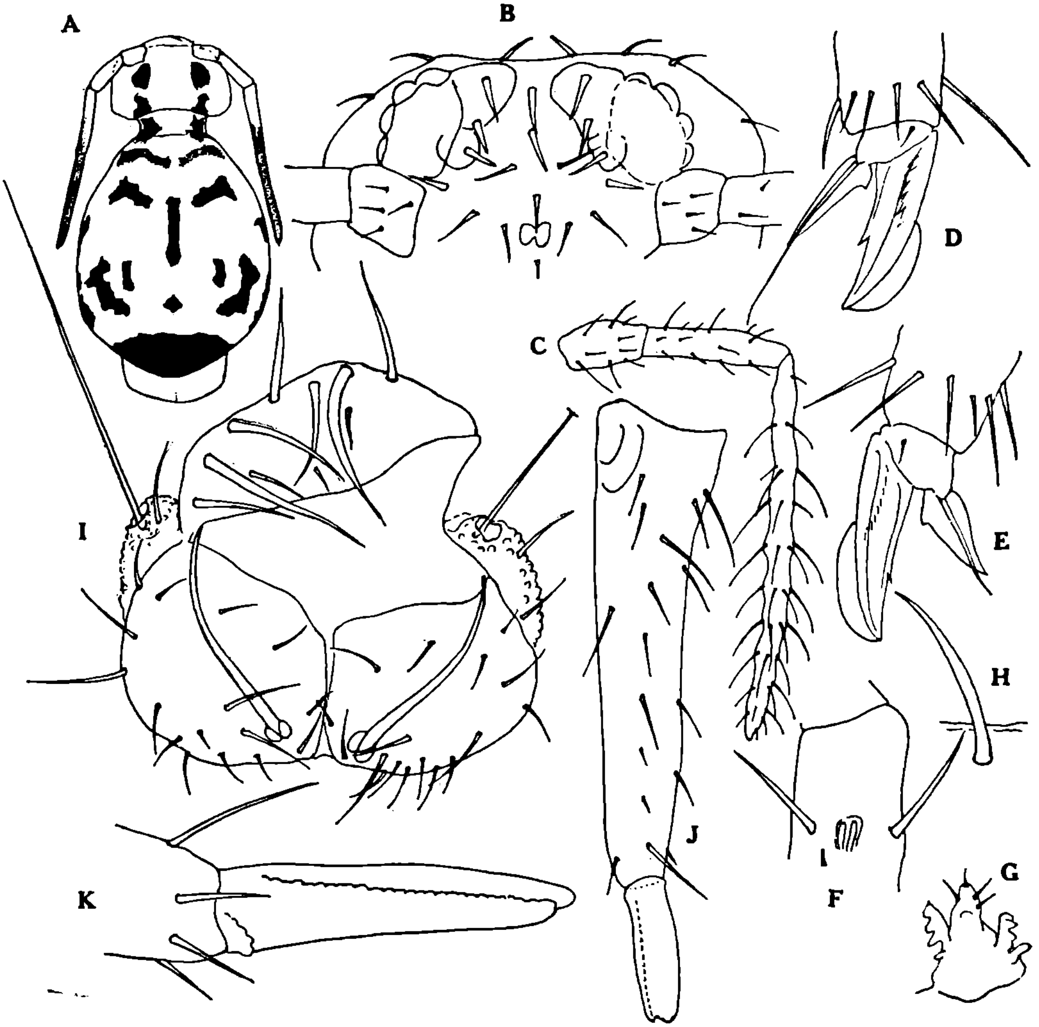

Fig. 41 *Sphyrotheca gangetica* sp. n.
A : Habitus, B : Setae of vertex, C : Antennae, D : Fore-claw, E : Hind-claw, F : Ant. III-organ, G : Tenaculum, H : A body seta of abdomen, I : Anal region, J : Dentes and mucro in dorsal view, K : Mucro in inner view.

transverse stripes one on the niveau of antennal bases and the other near the frontal margin. Legs and furcula pale. Ant./head as 1.8. Ant. ratio as 11 : 14 : 21 : 55. Ant. IV is not annulated, but setae are verticillating from each ring-like thickening. Ant. III-organ normal. Eyes 8+8, black. Vertical setae of the head spiny and arranged in typical manner of the genus. Thoracal vesicles absent. Other setae upon head is slender and curving. Legs with one blunt spine upon each trochanter. Tenent hair absent. Unguis dorsally carinate and with prominent tunica distally. Lateral pseudonychia probably present. An inner tooth is at about the middle. Unguiculus is triangular, with a prominent inner tooth near the basis. Upon fore-legs unguiculus and its terminal seta is very long, the latter surpassing the unguis, while it is shorter upon hind-legs. Tenaculum 3 toothed, corpus apically with 4 small setae. Manubrium is ventrally nude and dorsally with many setae. Dentes bearing simple setae as : Dorsal : 1, 1, 1, 1, 1, 1, 1 = 7, Outer : 1 . . . . 1, 1 . . . . 1, 2 = 6, Inner : 1 . . . . 1 . . . . 2 = 4, Ventral : 4 . . . . 1 . . . = 5. Mucro is smooth on outer and minutely serrated on inner margin. Distally there is a small incision and basal pseudonychium is present. Anal field has many smooth setae. Appendices anales are smooth, setiferous, strongly bent and apically elongated. Chaetal arrengement of the trunk is not observed, but all setae are rather small, smooth and curving toward the posterior direction. Setae sensuales smooth and needle-like. Integument is minutely granular all over the body.

Nearly related species is *S. boneti* (DENIS, 1948) of Vietnam and *S. santiagoi* YOSII, 1959 of Malay. From both of these the present species is characterized by the colour pattern, by anal appendages and by modified frontal setae.

An another example (♀) from Rangoon, Burma (18. X 1960) is slightly different from the above description viz. Body length 1.8 mm. Ground colour white. Clypeus with a median longitudinal patch. Antennal bases lightly pigmented. Abdomen without anterior median stripe. Large black area of the posterior half is absent. Ant. IV is distinctly subsegmented into 10 segments. Frontal setae of the head more strongly spinose in appearance. Dental setae represented as dorsal : 7, outer : 6, ventral : 4 . . . . 1 = 5 and inner as 1 . . 1, 1, 1, 1, 1 . . 2. The main difference consists, therefore, in subsegmentation of ant. IV and the number of the inner row of dental setae. Other features of the body including legs, mucro and appendix analis are the same. This Burmese example may be included in *Sphyrotheca gangetica* sp. n.

43. **Dicyrtomina (Pseudodicyrtomina) bombayensis** sp. n. Fig. 42

1 ♀, Kanheri near Bombay, 2. X 1960

Body length 1.5 mm. Colouration whitish. Antennae lightly pigmented distally. Head pale. Trunk light violet laterally and posteriorly. Anogenital segment, legs and furcula quite colourless. Antennae long, ant./head being 10 : 4.

It is 4-segmented and their ratio is as 5 : 24 : 25 : 5. Ant. IV not sub-segmented. Ant. III-organ is a pair of rodes. All antennal setae feeble Vertical setae of the head minute and reduced as in *Calvatomina*. Interorbital tubercle well developed. Eyes 8+8, poorly pigmented and each cornea is separately visible without treatment. Frontal setae also feeble, small and 6 in a median line. Labral setae 6/5, 5, 4. Lateral two pairs of the first row near to each. Inner pair of the second row longer than others. Distal margin with two pairs of marginal tubercles. Mandible, maxilla and labium not modified. Subcoxa of the fore-leg with a rounded posterior lobe, that of the mid-leg with an anterior, conical pro-

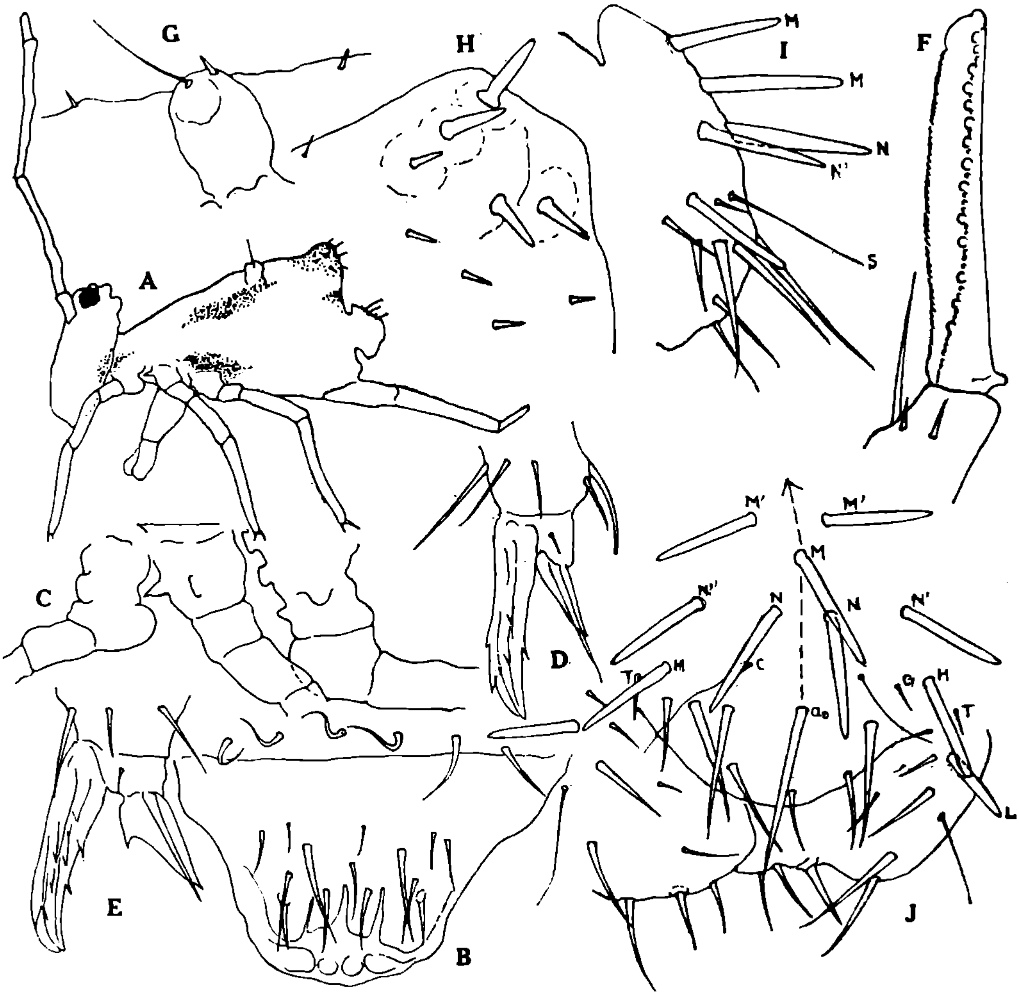

Fig. 42 *Dicyrtomina bombayensis* sp. n.
A : Habitus, B : Labrum, C : Process of coxae, D : Fore-claw, E : Hind-claw, F : Mucro, G : Abdominal vesicle, H : Profil of dorsal hump. I : Anogenital segment, J : Ditto (expanded).

cess. Unguis with an obscure, rugose dorsal pseudonychium and distally with a tunica. Inner teeth 1, 2, 2. Unguiculus narrow, acuminate and with long axial seta upon fore-legs. Upon others it is broad, with one inner tooth and the axial seta is just reaching to the apex or slightly longer than that. Modified setae of hind-tibiotarsus are blunt, short and 3 in number. Ventral tube long, the basal part has 1+1 distal setae near the end, terminal tubule very warty. Rami tenaculi tridentate, with a basal process to each. Corpus anteriores with 4 apical setae. Furca in ratio as 4 : 12 : 3. Manubrium ventrally nude and dorsally with 7+7 symmetrically disposed setae. Dentes tapering, with setae arranged as dorsal 4, outer 10, inner 10 and ventral 3, 2, 1, 1, 1 -- 1 = 9. All of them are smooth, never serrated. Mucro elongate, apically rounded, outer margin very minutely serrated, while the inner margin is with many (ca. 40) rounded teeth, where larger and smaller teeth are ranging alternatively. Body surface is minutely granular all over. Trunk is anteriorly flattened and with feeble body setae. Posteriorly a remarkable median hump is protruding upon which short, thick, almost blunt setae are located symmetrically and the area around each seta is divided into fields by the pattern of the integument. Genital setae blunt, M is 3/4 of the mucro in length. Setal arrangement is near *Ptenothrix* (cf. YOSII et LEE, 1962), but M is posteriorly dislocated as usual of *Dicyrtomina* and, besides, with two pairs of well developed N setae (N and N'), both of which are subequal in length. G and T setaceous. H blunt and large. L blunt. Upon anal flaps all anal setae are smooth and straight. a_3 of the upper flap and a_1 of the lateral flap is smaller than others. sa and sa' subequal. sa_1 is shorter than sa_2. Appedix analis is short, not modified from other anal setae.

The species forms a special group within *Dicyrtomina* by the shape of trunk, structure of mucro, subcoxa and genital setae. The genus *Pseudodicyrtomina* STACH 1957 is established for such forms to include *D. trunkana* UCHIDA 1944 and *D. verrucosa* HANDSCHIN, 1930. The present species is more likely to be related to the latter species from Philippine. Further investigations are, however, in need.

An another example ♀ from Nasic near Bombay (30. IX 1960) has larger body size 1.4 mm. and same pale colouration. Anogenital chaetotaxy is as described above, but upper anal flap is bearing a_{1-3}, instead of usual a_{1-4}. G and T seta are acute, as long as L and only slightly shorter than blunt H-seta. All anal setae are slightly rugose.

44. **Dicyrtomina (Calvatomina) cruciata** subgen. n. sp. n. Fig. 43

4 ♀, Malabar Hill in Bombay, 30. IX 1960

Body length 1.0 mm. in female. Ground colour pure white, but with deep purplish pigmented pattern on dorsal half of the body. Antennae distally dark. Head with a lateral patch posterior to eye-field. Larger abdominal part has, in dorsal view, two transverse bands anteriorly interrupted at the middle, a paired patch and a median, very conspicuous cross at about the middle. Lateral and posterior part of abdomen are deeply pigmented. Ventral side, anogenital segment, legs and furcula quite pale. Ant./head as 2 : 1. Ant. ratio as 3 : 13 : 16 : 4. All segments not subsegmented. Ant. III-organ normal and the distal end of ant. III is protruding on one side to the direction of ant. IV in considerable length. Eyes 8+8, black. Interorbital process highly rounded. Vertical setae of head reduced and minute. Frontal setae 1, 1, 1, 1, 1, 1 = 6, not modified. Labral setae 6/5, 5, 4, the median three of the first row small, inner pair of the second row long and dislocated far proximally to the niveau of the first row. Distal margin with 2+2 tubercles. Unguis broad, dorsally with irregular pseudonychia and distal tunica. Inner teeth 2, 2, 2. Unguiculus is acutely lanceolate and with long axial seta upon fore-legs and broadly foliaceous, with an inner tooth and with short axial seta upon others. Modified setae of hind tibiotarsus 3, blunt and short. Subcoxa has, as in *Pseudodicyrtomina bombayensis* sp. n., a broad, rounded posterior lobe upon fore-legs, a conical, finger-like anterior process upon mid-legs and two round-

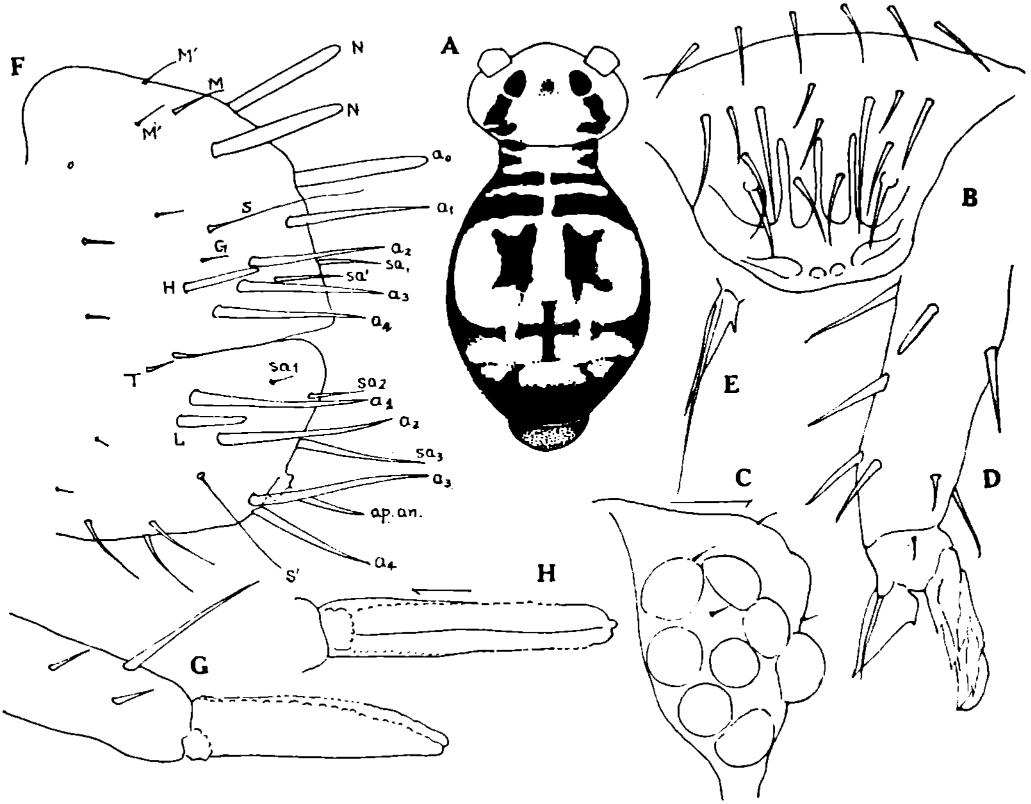

Fig. 43 *Dicyrtomina (Calvatomina) cruciata* sp. n.
A : Habitus, B : Labrum, C : Eyes, D : Hind-claw, E : Unguiculus of fore-claw, F : Anogenital segment, G, H, Mucro in onter and ventral view.

ed trabecular lobes upon hind-legs. Ventral tube warty distally. Tenaculum normal. Furca in ratio as 2 : 3 : 1. Manubrium with 9+9 simple, smooth dorsal setae. Dentes with setae arranged as dorsal : 4, inner : 10, outer : 10, ventral : 3, 2, 1, 1, — 1 = 8, lateral setae all smooth. Mucro ventrally carinate, with a basal pseudonychium and apically ending in a rounded process. Both mucronal margins are so minutely serrated that it is incalculable and distal part of each sides are, indeed, practically smooth. Body setae anteriorly very small, posterior ones are blunt, thick and subconical. Anogenital chaetotaxy is very near *D. pallida* sp. n., M, M′ being small setae and N, A_0 being macrochaetes. Upper anal flap has a_1-a_4 all smooth. G setaceous, short. H blunt, T small. sa′ is longer than sa, both smooth. Lateral flap bears a_{1-4} all smooth, sa_1 minute, sa_2 short, sa_3 is long, longer than the setaceous appendix analis. L-seta blunt.

The species has a distinct body marking fairly constant in all examples at hand. Morphologically it is very near *D. pallida* sp. n. in details including the anogenital setae, but different in that H, L are blunt macrochaetes in this species, while they are setaceous and acute in the cited species.

There are considerable number of *Calvatomina* subg. n. in the tropical Asia ranging from India to Formosa and Japan. They are variegated in colour pattern, but morphologically poorly differentiated. Arrangement and form of anogenital setae of female must be studied in each species. They are common in that the vertical setae of the head is reduced and very minute. The subgenus *Calvatomina* subg. n. must be erected to accomodate these natural group of species.

Subgenotypus : *Dicyrtomina curciata* sp. n.

45. **Dicyrtomina (Calvatomina) pallida** sp. n. Fig. 44

3 expl. Kanheri near Bombay, 2. X 1960, 2 expl. Nasic near Bombay, 29. IX 1960.

Body length 0.2 mm. Ground colour dirty white, antennae violet, head almot pale except a median frontal spot. Larger abdominal violet blue dorsally and scattered with pale spots, where setae and s. s. are incerted. Ventral side and all extremities are pale. Ant./head as 10 : 17. Ant. ratio as 2 : 8 : 13 : 3. All segments not annulated. Setae upon vertical part of the head and anterior half of larger abdomen are all reduced to minute, curving setae as in other forms of *Calvatomina*. Upon posterior half of abdomen setae are larger, spiniform and blunt. Eyes 8+8, black. Unguis robust, with 2 very distinct inner teeth, dorsally tunicated and with feeble pseudonychia. Unguiculus broad, apically pointed and a inner process is more distinct in fore-legs. An axial filament is surpassing the unguiculus by far upon fore-legs, considerably in mid-legs and not so in hind-legs. Furcula in ratio as 4 : 9 : 3. Manubrium is dorsally setose and ventrally nude. All dental setae smooth. Dorsal setae 4, but d_1, d_4 are two times longer than other two dorsal setae. Outer row of setae 10. Distal 4 setae in relative lengths as 4 : 5 : 5 : 7. The distance between a_3 and a_4 is larger than between others. Inner

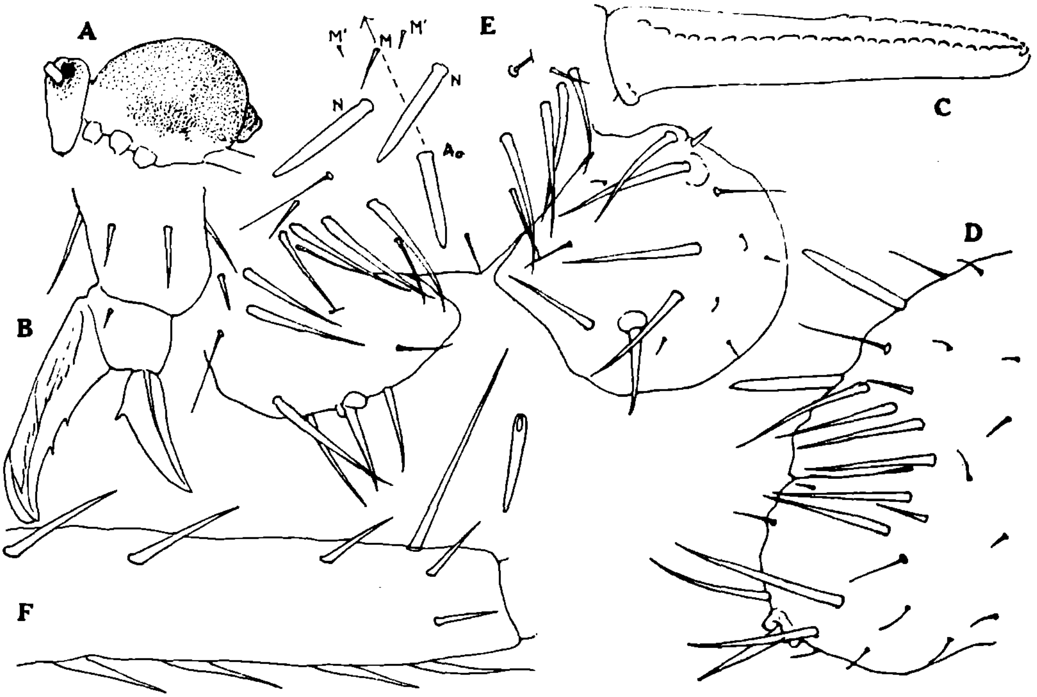

Fig. 44 *Dicyrtomina (Calvatomina) pallida* sp. n.
A : Habitus, B : Hind-claw, C : Mucro in inner view, D : Anogenital segment, E : Ditto in expanded condition, F : Outer view of dentes.

row of setae 9, the distance between i_5 and i_6 larger than others. Ventral setae 3, 2, 1, 1 . . . 1. Mucro is apically notched. Inner margin is minutely serrated upon distal half, the proximal part being smooth (in some specimens this smooth portion is minutely serrated in smaller pitch than the anterior half). Upon anogenital segment both M and M' are simple setae. M' is smaller. A paired N are macrochaetes. Ghost-seta (G) is absent. H, L moderately long, acute. T is very minute. a_0 is a large, blunt macrochaeta and $a_{1\text{-}4}$ are all slender. sa is minute, while sa' are very large. Laterally appendix analis is straight and conically pointed, not longer than the adjacent sa_3. sa_1 is minute, sa_2 larger but setaceous. sa_3 is as large as a_4.

The species is to be distinguished by gray-violet colouration of the body from other members of *Calvatomina*. Morphologically it differs from others by M-seta of anogenital segment not being macrochaetes and H-seta being slender.

46. **Dicyrtomina (Calvatomina) pagoda** sp. n. Fig. 45
3 expl. Peradeniya, Ceylon, 10. X 1960, 3 expl. Botanical Garden in Calcutta, 15. X 1960, 3 expl. Rangoon, Burma, 17. X 1960.

Body length up to 1.5 mm. Ground colour white, dorsal side of the body

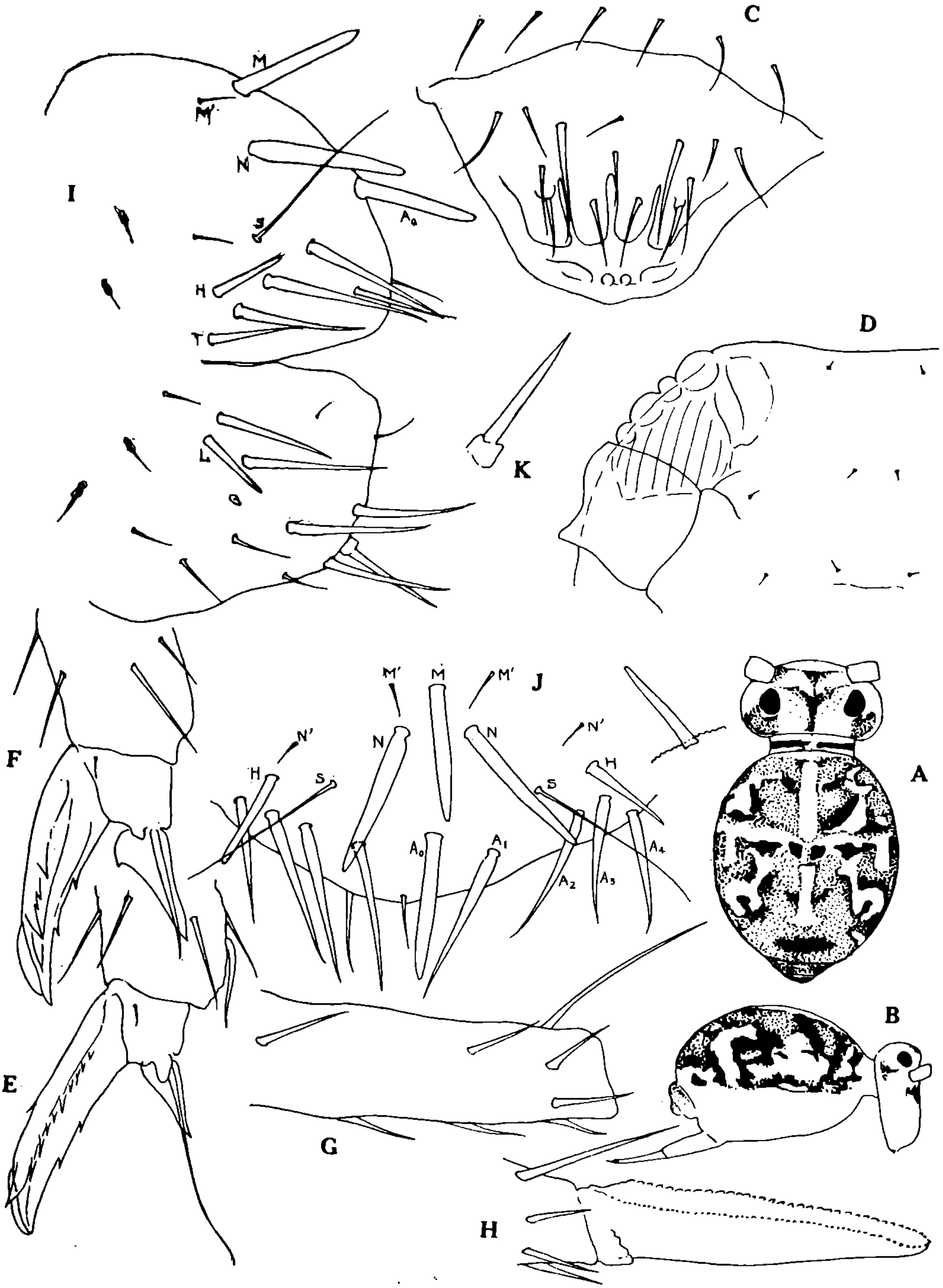

Fig. 45 *Dicyrtomina (Calvatomina) pagoda* sp. n.
A : B : Habitus, C : Labrum, D : Vertex, E : Fore-claw, F : Hind-claw, G : Dentes (outer view), H : Mucro (outer view), I : Anogenital segment (lateral view), J : Ditto (dorsal view), K : Appendix analis.

lightly brownish. Antennae violet, head slightly violet median and behind eyes. Trunk is adorned with blackish purple pigments as figured. The most striking features are transverse stripes anteriorly upon thoracal part, paired black spots at about the middle and a pair of lateral, longitudinal streaks forming a complex pattern posteriorly. Anogenital segment somewhat pigmented or pale. Ant./head as 9 : 5. Ant. ratio as 7 : 34 : 40 : 8, all segments not annulated. Ant. III-organ is a paired rods without accessory setae. Vertical setae of the head minute. Interorbital process rounded and low. Facial setae 6, median in one row. Labrum with setae as 6/5, 5, 4, the first row feeble, inner pair of the second row proximally dislocated and very long. Distal labral margin with a pair of inner, rounded and larger, outer pair of tubercles. Unguis dorsally with conspicuous pseudonychia and distal tunica, with 1, 2, 2 (Ceylon examples) or with 2, 2, 2 (Burmese examples) inner teeth. Unguiculus triangular, small on fore-legs, larger and with a corner tooth upon hind legs. Axial filament very long upon fore-legs and slightly surpassing upon other legs. Ventral tube with 1+1 terminal setae. Rami tenaculi tridentate, with a basal process and corpus with 4 apical setae. Furcula in ratio as 9 : 15 : 5. Manubrium dorsally with some simple setae and ventrally nude. Dentes with smooth setae arranged as dorsal : 4, inner 10, outer 10, ventral as 3, 2, 1, 1--1. Of the outer row of dental setae the distal three are almost equal in length and the fourth seta is located somewhat apart from them. Mucro with basal pseudonychium and apically incised. Both margins are serrated and the outer margin is more minutely so than the inner margin. Trunk anteriorly with feeble setae, those of the posterior half are upwright, blunt and 1/3 the length of mucro. Upon anogenital segment M, N, and A_0 are all large, blunt macrochaetes, while M' are feeble setae. G-seta absent. H and L are short, but blunt. Upper anal flap has a_{1-4} all slender, smooth. sa shorter than sa', all smooth. T setaceous and short. Upon lateral flaps a_{1-4} subequal, $sa_{1,2}$ small, sa_3 very large. Appendix analis is spiny, upon socket, but not much different from anal setae.

The species is characterized by the blunt M-setae from other two species here described. Burmese examples are quite near the typus in colour pattern and others, while Calcutta examples are paler and the outer row of dental setae are slightly feathered basally. Whether they are to be separated is not certain for the moment.

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Snow Collembola of the Siachen Glacier in Karakoram

By

Riozo YOSII*

During their successful tour throughout the Siachen Glacier in Karakoram, which has resulted the first ascent of Saltoro Kangri 7,742 m. alt. in 24. July 1962, members of the Academic Alpine Club of Kyoto has taken special efforts to investigate the natural history of this snowy region, the innermost part of Himalayas. Camping on the glacier, Prof. T. SHIDEI, leader of the party has noticed the small, black creatures swarming on the surface of the ground, when new snow has fallen. These insects have been carefully gathered and brought home by Mr. Y. TAKAMURA, one of the summitters of Saltoro Kangri and kindly submitted to the author for investigation. The material includes two species of springtails, one of which represents a new genus of *Isotomidae*, while the other is a kind of *Tomocerus*. Hearty thanks are directed to above mentioned colleagues and friends, who has thus thrown light to the distribution of cryophilous forms of collembola, for which we know very little about the Himalayan region.

Aackia gen. nov.

Typus: *Aackia karakoramensis* sp. n.

An Isotomid genus alike to *Granisotoma* STACH 1947 in many respects. Labral structure is different having 4 rounded teeth upon a transverse ledge. Dorsal granules of dentes are not rounded but transversely elliptical and alike to usual crenulation. Proximal portion of dentes is with many feeble setae, somewhat alike to *Isotomurus*. But labral margin is not with longitudinal incisions and no plumose s. s. is to be seen. Ventral manubrial setae are as in *Desoria* (sensu YOSII, 1963) from which it is separable by labral structures and by the chaetal arrangement on dorsal side of dentes. From *Isotoma* (sensu YOSII, 1963) it is also to be separated by its manubrial ventral setae distally not becoming spiniform. Presence of peculiar dorsal swelling distally upon dentes is very characteristic. Probably *Aackia* g. n. is the near relative of *Pteronychella* but without having large pseudonychia upon unguis.

The name is derived from the initial letter of the "*Academic Alpine Club in Kyoto*", for whose honour the genus is dedicated.

In the following key character of these genera are summarized:

A_1 Manubrium with few number of ventral setae..............*Proisotoma* Complex

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* Yoshida College, Kyoto University, Japan.

A_2 Manubrium with many ventral setae

B_1 Labral margin with 4 granules. Manubrial ventral setae distally spiniform .... *Isotoma*

B_2 Labral margin with a transverse ledge having 4 rounded teeth.

  C_1 Dentes dorsally granulated throughout. Unguis with a dorsal sheath basally .... *Agrenia*

  C_2 Dentes dorsally without granules.

    D_1 Unguis with pseudonychia..*Pteronychella*

    D_2 Unguis without pseudonychia...*Aackia* g. n.

B_3 Labral margin with 4 incisions.

  C_1 Without ciliated s. s.

    D_1 Dentes with granules.. *Granisotoma*

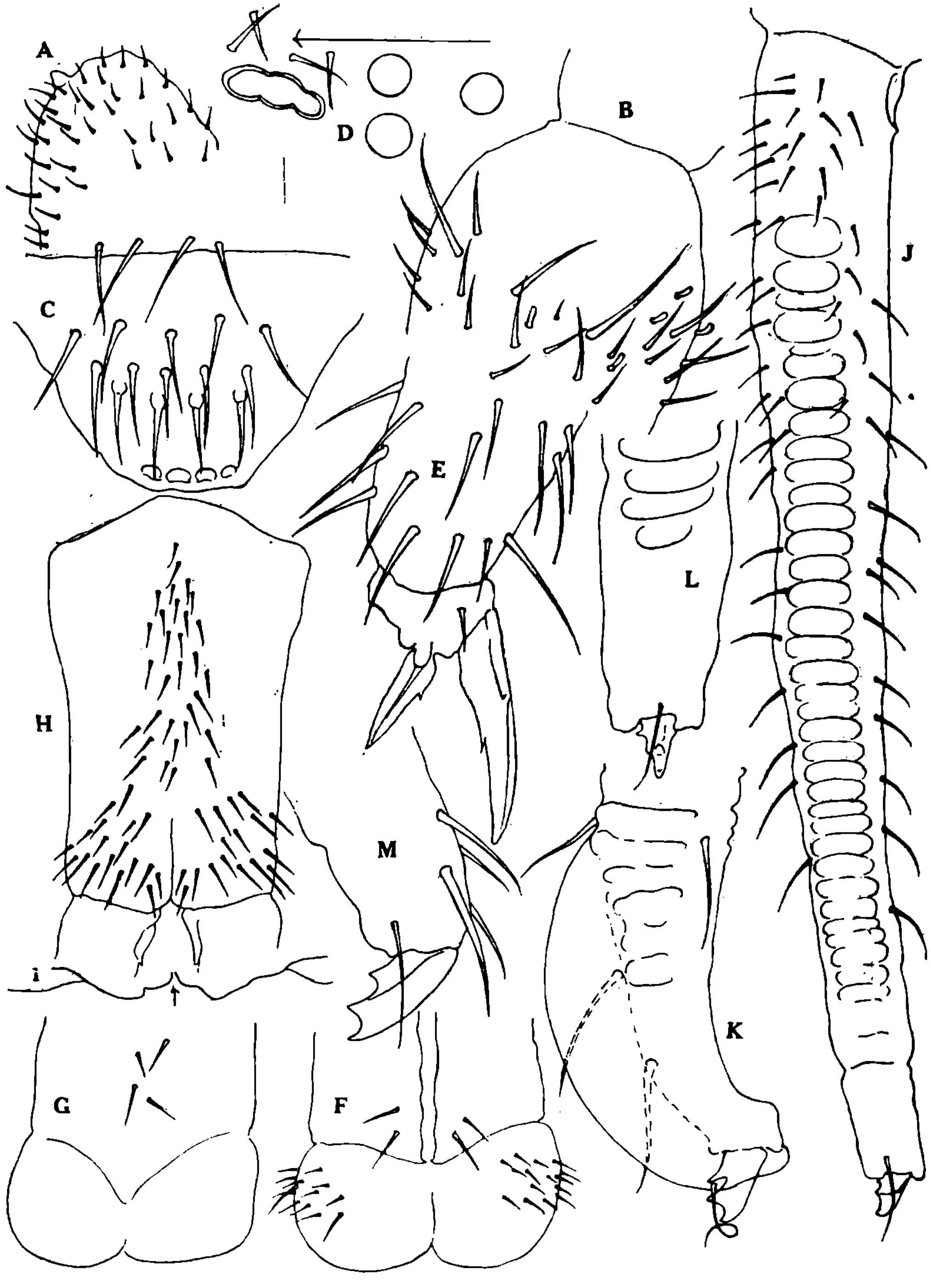
    D_2 Dentes without granules.. *Desoria*

  C_2 With ciliated s. s. Dorsal side of dentes crenulated and proximally with many setae.. *Isotomurus*

Aackia karakoramensis sp. n.

Many expls. Siachen Glacier 5,000 m. alt. Karakoram, VII 1962

Body length 1,3 mm. Intensely black all over the body including antennae, legs and furcula. Ant./head as 4 : 3. Ant. ratio as 1 : 2 : 2 : 3. Ant. IV with a low subapical cone, but without any sensory setae. All setae of the segment are small. Ant. III-organ composed of about 6 small sensory rods dispersed near the distal end. Other antennal setae normal and simple. PaO is elongate, elliptical, with or without light crenulations of the wall and its long axis is about twice the diameter of an eye. Eyes 8+8, intensely black. Eye-field is not descriminated fiom surrounding parts, being so deeply pigmented as the latters. Labrum with setae as 4/5, 5, 4, distal ones upon heavy sockets. Distal margin is provided with 2+2 small, transverse teeth connected by a ledge. Other buccal apparatus normal. Legs without tenent hairs. Unguis strong, with a pair of small dorsolateral and one inner tooth. Unguiculus lanceolate, acute apically and with one inner tooth. Ventral tube short, anteriorly with 2+2 setae. Posterior face has 4 small setae. Lateral flap is beset with about 15 setae. Rami tenaculi quadridentate, corpus with some 9 setae. Furcula long, in ratio as 7 : 12. Manubrium is ventrally with relatively small number of short setae in a triangular area. Dorsal side has many minute setae. Terminal thickening not prominent and rounded. Dentes not tapering distally, almost parallel-sided. Ventral setae numerous and becoming slightly longer near distal end. Dorsal side is with many transverse folds, but they are not so typical as in *Isotoma* or *Desoria* and may be regarded, in reality, a row of transversely elongated granules of the integument. Basal portion of it is beset with many small setae alike to *Isotomurus* and both sides of the median striated area are beset with ca. 15 pairs of setae. Near the distal



Aackia karakoramensis g. n. sp. n.

A: End of antenna, B: Ant.III-organ, C: Labrum, D: Postantennal organ, E: Hind claw, F, G: Ventral tube (anterior and posterior face), H: Mannubrium (ventral view), I: Terminal thickening, J: Dentes and mucro (dorsal view), K, L, M: Distal end of dentes with mucro from various directions.

end of dentes the integument is very remarkably swelling and there is no granules nor lateral setae, except for one seta directly before the mucro. This seta is always present in all examples examined. Mucro almost parallel-sided, lightly curving and tridentate. Apical and anteapical tooth subequal, the third tooth smaller and attached to the outer side. From the anteapical tooth to the basis there is a longitudinal ledge on inner side of the mucro. No mucronal seta present. Integument is smooth. Body setae are all small, simple and smooth.

The species may be near "*Podura*" *himalayana* BAIJAL, 1955. But, according to him, this species has no postantennal organ. *Isotoma sarkundensis* BAIJAL, 1958 has the mucro alike to the present form. However, postantennal organ is smaller, unguis and unguiculus is untoothed and furcula has no distal swelling upon dentes.

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Index

of

generic names, synonyms in italics (pages)

Aackia 407
Abemus 259
Acanthaclisis 224
Acantholimon 122
Acanthophyllum 88
Acer 108
Achillea 141
Achnanthes 24, 56, 62
Aconitum 91
Acorus 79
Acrocyrtus 368, 370
Adenocaryum 126
Adesmia 242
Adonia 201
Adoretus 234
Aegeriidae 331
Aellenia 87
Aeschna 160
Afghanaphis 267
Agabus 255
Agrimonia 99
Agropyron 69
Agrostis 69
Alcea *108*
Aleochara 261
Alhagi 101
Allium 80
Allocapniella 209
Alloperla 214
Alloscopus 370
Allyssum 95
Alopecurus 70
Althaea 108
Altica 219
Amaranthus 87
Amberboa 142
Ameletus 288
Ampelopsis 108
Amphalius 251
Amphicome 137
Amphinemura 204
Amphipoda 315
Amphora 29, 48, 64
Anabaena 55
Anabasis 85
Anagallis 121
Anax 160
Anchicera 240
Andrachne 106
Andropogon *76*
Androsace 121
Anemone 91
Anisosciadium 112
Ankistrodesmus 36
Anomoeoneis 26
Anthemis 142
Anticus 247
Antitoxicum *124*
Anurans 327
Apatania 329
Aphididae 263
Aphodius 232
Aphthona 219
Apion 227
Arabidopsis 96
Arenaria 88
Aristida 70
Arnebia 125, *130*
Arrhopalites 348
Artemisia 142, *146*
Arthrophytum 85
Arum 79

Ascalaphus 224
Ascocyrtus 370
Asperula 140
Astenus 258
Aster 143
Astragalus 101
Asyneuma 141
Atraphaxis 84
Atriplex 86
Atropis 76
Attagenus 239
Aulacospermum 119
Avena 71
Axelsonia 362

Baetis 289, 304
Ballistura 357
Batrachium 91
Bedelia 217
Bellevalia 81
Berberis 94
Berula 112
Betula 83
Bezzia 282, 285
Bidens 144
Blaps 242
Blatta 155
Blattaria 155
Bledius 258
Blepharocera 274, 277
Blumea 144
Bothriospermum 127
Bourletiella 349
Brachycaudus 269
Brachystomella 349
Brassica 96
Breea 144
Bromus 71
Buchingera 96
Bufo 327
Bunium 112
Bupleurum 113

Calamagrostis *70*, 72
Callyntrura 375, 377
Caloneis 25, 46
Calonyx 190
Calopteryx 160
Calosirus 228
Caltha 91
Camellina 96
Campanula 141
Camphorosma 86
Cannabis 83
Cantharis 238
Capnia 206, 208
Capparis 95
Capsella 96
Carduus 144
Carex 78
Carpelimus 257
Carthamus 144
Carum 113, 119
Catabrosia 72
Catalpa 137
Celtis 83
Centaurea 144
Centaurium 124
Cephaloncus 239
Cephalorrhynchus *150*
Cephalorrhizum 123
Cerastium 88
Ceratocarpus 86
Ceratoneis 22, 50, 61
Ceratophysella 333
Cercis 103
Ceriodaphnia 320
Cestode 165
Chaerophyllum 113
Chaetolimon 123
Chaetocnema 218
Chaitophorus 265

Chamaenerium 110
Chenopodium 86
Chesneya 103
Cheumatopsyche 329
Chloebius 228
Chlorophanus 227
Chondrilla 144
Chorispora 96
Christolea 96, *97*
Chromonotus 228
Chrysanthemum 146
Chrysomelidae 217
Chrysopa 221
Cicer 103
Cicerbita *150*
Cichorium 147
Cirsium 147
Cistanche 138
Citellophilus 249
Cladocera 315
Clematis 92
Clinopodium 133
Cloeon 289, 309
Closterium 37, 57
Cobresia 79
Coccidula 201
Coccinella 201
Coccinellidae 201
Cocconeis 24, 62
Coelastrum 57
Collembola 333, 407
Collophora 391
Colpodium 72
Conringia 96
Convolvulus 125
Copepoda 315
Corixa 226
Coriandrum 113
Corticarina 241
Cortusa 121
Corydalis 94
Cosmarium 37, 44, 52, 57, 63, 66
Cousinia 147
Craniospermum *130*
Crataegus 100
Crataraea 261
Cremastosciadium 113
Crepis 148
Crocothemis 161
Crombrugghia 331
Crossostephium *146*
Crypticus 243
Cryptophagus 240
Cueta 223
Culicoides 282, 285
Cuscuta 125
Cybister 255
Cyclops 321
Cymatopleura 35
Cymbella 29, 44, 46, 48, 50, 63, 64
Cynanchum 124
Cynoglossum 127, *129*
Cyperus 79
Cyphoderopsis 386
Cyphoderus 381, 383
Cyphogenia 242

Daphne 110
Daphnia 316
Dasytrogus 234
Daucus 113
Deschampsia 72
Descurainia 96
Desoria 338
Deuterophlebia 273
Diamesa 274, 278
Dianthus 88
Diarthron 110
Diatoma 22, 61
Dicranocentroides 379
Dicranocentrus 371
Dicyrtomina 396, 398, 400, 401

Didymoshenia 65
Didymosphaenia 32
Dinarthrum 329
Dionysia 121
Diploneis 24
Dipsosphecia 331
Dlochrysa 218
Dorema 113
Draba 96
Drepanosira 343
Ducrosia 113

Ebaeus 239
Ecdyonurus 288, 296
Echinophora 113
Echinops 148
Echinospermum *127*, *130*
Echioides 127
Echium 127
Elaeagnus 110
Eleocharis 79
Eleuterospermum 114
Elmidae 169
Elmis 165
Elsholtzia 133
Elymus 72, 76
Eminium 79
Enallagma 159
Entomobrya 340
Epeorus 288, 300
Ephedra 68
Ephemerella 289, 310
Ephemeroptera 287
Epicauta 245
Epilobium *110*, 111
Epipactis 81
Epithemia 33
Eragrostis 72
Eremochion 86
Eremopyrum 73
Eremopoa 72
Eremurus 81
Erigeron 148
Eringium 114
Eritrichium 127, *131*
Ermania 97
Erophila 97
Eudorina 36
Euglena 20, 44
Eunotia 24, 48, 56, 86
Euphorbia 106
Euphrasia 136
Euspermophagus 248
Exochomus 201

Fagopyrum 84
Falagria 260
Ferula 114
Festuca 73, *74*
Ficus 83
Forcipomyia 282, 284
Fragilaria 22
Frustulia 62
Fumaria 95

Galium 140
Gammarus 322
Gaurodytes 255
Gentiana 124
Gentianella *124*
Geranium 106
Gerris 225
Geum 100
Girgensohnia 86
Glaucium 95
Glossosoma 329
Glyceria 73
Glycyrrhiza 104
Gomphonema 32, 48, 56, 65
Gonatozygon 37
Gonium 36
Gonocephalum 243

Guignotus 255
Gymnopleurus 233
Gypsophila 88
Gyrosigma 25, 62

Halerpestes 92
Hantzschia 34, 50, 56, 65
Hantzshia 56
Hapalaraea 257, 261
Heldreichia *98*
Heliotropium 128
Helophorus 256
Heptaulacus 233
Heracleum 115, 117
Hetrocaryum 128
Himalopsyche 329
Himatendipes 283
Hippuris 112
Hordeum 73, *76*
Hyalopterus 265
Hybosorus 231
Hydrachnellae 189
Hydrurus 21, 44, 61
Hymenolaena *119*
Hyoscyamus 136
Hypecoum 95
Hypera 228
Hypericum 109
Hypogastrura 334

Impatiens 108
Incarvillea 137, *137*
Inula 149
Isatis 97
Ischnopoda 261
Ischnura 159
Isoperla 212
Isotoma 338
Isotomiella 363
Isotomina 337, 360
Isotomurus 338, 364

Johrenia 118
Juglans 83
Juncus 80
Juniperus 68

Kochia 87
Koeleria 73
Koelpinia 149
Kudrjashevia 133

Lactuca 150
Laena 244
Lagochilus 133
Lagonychium 104
Lamium 133
Lampyris 235
Lappula 129
Lasiagrostis *77*
Lathridius 241
Lathyrus 104
Launaea *151*
Lebertia 199
Lemna 79
Leontopodium 150
Lepidium 97, *98*
Lepidocyrtus 370
Lepidolopsis *146*
Leptorhabdos 136
Lepyrodiclis 89
Lestes 160
Leucopoa 73
Libellula 161
Ligusticum 118
Limonium *123*
Linaria 137
Lindelofia *126*, 129
Linum 106
Listera 81
Lithospermum 129, *130*
Lobella 351, 353
Lolium 74

Longitarsus 219
Lonicera 140
Lotus 104
Lycopus 133
Lyngbya 19
Lytta 245

Macrotomia *127*, 129
Malcolmia 97
Malus 100
Mantura 219
Marrubium 133
Matricaria 150
Mattiastrum 130
Medicago 104
Megalothorax 390
Melandrium *90*
Melica 74
Meligethes 240
Melilotus 104
Melosira 22
Mentha 133
Meridion 22
Merismopedia 17
Mertensia 130
Mesostena 241
Metasequoia 68
Microdera 241
Microrhynchus *151*
Microlonchus *151*
Microparonella 378
Microtus 271
Minuariia 89
Moltkia *130*
Moniezia 165
Morinia 141
Morus 83
Muhlenbergia 74
Mulgedium *150*
Mylabris 246
Myllocerus 228
Myosotis *128*, 131
Myriactis 150
Myricaria 109
Myrmecaelurus 223

Nanocladius 280, 282
Nanurus 21, 44, 54
Nardurus 74
Nasturtium 97
Navicula 26, 46, 48, 50, 62, 63
Necrobia 239
Negastrius 236, 237
Nemoura 203
Nepeta 135
Nitzschia 34, 48, 50, 65
Nodularia 20
Nonnea 131
Nostoc 20, 61
Notonecta 225
Notoxus 247
Neuroleon 223
Neuroptera 221

Ocnera 242
Odonata 159
Oligochaeta *151*
Oncopodura 389
Ononis 104
Onopordon 151
Onosma 131
Onychiurus 335, 337, 357
Opatroides 243
Orchesellides 343, 345
Orchis 81
Orobanche 138
Oropsylla 251
Orthetrum 161
Orthocladius 279, 281
Oryctes 234
Oryzopsis 74
Oscillatoria 17, 44, 55, 59, 61, 63

Osmylus 221
Otiorrhynchus 227
Oulema 217
Oxygraphis 93
Oxyria 84
Oxytelinae 257
Oxythyrea 234
Oxytropis 104

Pachyscelis 242
Paederus 258
Palpares 222
Panicum 74
Paracaryum *130*, 131
Paramicrorhynchus 151
Parnassia 99
Parrya 97
Pediastrum 36, 57
Pedicularis 137
Peganum 106
Perlodes 211
Petalomonas 20, 44
Peusedanum 118
Phacus 20, 44, 56
Phaeonychium 98
Phalaris 74
Philonthus 258
Phleum 75
Phormidium 19
Phyllotreta 219
Picridium *151*
Pimpinella 118
Pinnularia 28, 46, 63, 64
Pisum 105
Planaria 175
Plantago 139
Platanus 99
Platynoscelis 243
Platytaenia *118*
Plecoptera 203
Pleurophorus 233
Pleurospermum 119
Plutella 229
Poa 75
Pogonatherum 76
Polyathron 248
Polycelis 176, 182
Polygonum 84
Polyphaga 155
Polyphylla 234
Polypogon 76
Populus 82
Potamogeton 69
Potamonectes 255
Potentilla 100
Poterium 100
Potosia 235
Prangos 119
Prasiola 42
Prenanthes *151*
Primula 121
Protziella 192
Prunus 100
Psathrostachys 76
Pseudocastalia 235
Pseudocyphoderus 384
Pseudosinella 342
Psychomyia 329
Psylliostachys 123
Pterophoridae 331
Pterophorus 331
Pteropyrum 85
Puccinellia 76
Pulex 249
Pulicaria 151
Pycnocycla 119
Pyramidopterca 119
Pyrola 120

Rana 327
Ranunculus *92*, 93
Reaumuria 109

Regimbartia 256
Reichardia 151
Rhaponticum 151
Rhithrogena 288, 304
Rhopalodia 33
Rhyacophila 329
Rhyssemus 233
Ribes 99
Richteria *146*
Rindera 131
Robinia 105
Rochelia 132
Roegneria 76
Roripa 98
Rosa 100
Rubia 140
Rubus 101

Sagina 89
Salina 373
Salix 82
Salsola 87
Salvia 135
Saponaria 89
Saprinus 231, *231*
Saussurea 151
Scaligeria 119
Scandix 119
Scapholeberis 318
Scarabaeus 233
Scariola *150*
Scenedesmus 37, 57
Schischkinia 151
Schismus 77
Schumeria *152*
Scirpus 79
Scopaeus 258
Scorzonera 151
Scrophularia 137
Scutellaria 136
Sedum 99
Seira 364, 365, 367
Selenastrum 36
Selinum 120
Sempervivella 99
Senecio 152
Serratula 152
Setaria 77
Shizothrix 19
Siegesbeckia 152
Sigara 226
Silaus 120
Silene 89
Simocephalus 318
Siphonaptera 249
Sisymbrium 98, *98*
Sitona 227
Sium 120
Smicronyx 228
Sminthurides 347, 391
Sminthurinus 348
Sminthurus 394
Solanum 136
Solenanthus *129*, 132
Sonchus 152
Sparganium 69
Spathipappus *146*
Sperchon 194, 196, 197
Spergula 89
Sphaeridia 347, 391
Sphyrotheca 395
Spiranthes 81
Spirulina 18
Spongiosyndesmus 120
Stachys 136
Staphylinidae 257
Staurastrum 41, 52
Stauroneis 24, 46, 62
Stellaria 90
Stenus 258
Stipa 77
Stroganowia 98

Suaeda 87
Subisotoma 359
Surirella 35, 50, 63, 66
Sympetrum 161
Syndiamesa 278
Synechococus 17
Synedra 23, 61

Tabellaria 22
Tachinus 259
Tachyporus 259
Taeniatherum 77
Tamarix 109
Taraxacum 152
Tauscheria 98
Tetracme 98
Tetraedron 56
Thalictrum 94
Theone 218
Torilis 120
Torularia 98
Trachydium 120
Tragopogon 152
Trichocladius 281
Trichodesma 132
Trichophorum 79
Trichoptera 329
Trifolium 105
Triglochin 69
Trigonella 105
Trikeraia 77
Triticum 78
Trollius 94
Tulipa 81
Typha 69

Ulmus 83
Ulothrix 42
Uranodactylus *98*
Urtica 83

Vaccaria 90
Valeriana 141
Vaucheria 21
Velezia 90
Velia 225
Verbena 132
Veronica 137
Vicatia 120
Vicia 105
Vincetoxicum *124*
Vitex 132
Volutarella 153

Waldheimia 153
Winklera 98

Xenylla 334
Xeranthemum **153**

Yponomeuta 229

Zeuxine 81
Ziziphola 136
Zollikoferia *150*
Zophosis 241
Zosimia 120
Zygophyllum 106